RE: Comments on draft Air State Facility Permits for Dominion "New Market Project"
Application ID: 4-2730-00038/00001 - Brookman Corners Compressor Station
Application ID: 7-2530-00033/00001 - Sheds Compressor Station
Application ID: 8-0740-00081/00001 - Horseheads Compressor Station

The following comments are submitted for the public record on behalf of the parties named below in regard to draft Air State Facility permits for the Dominion "New Market Project."

I. Introduction

On June 2, 2014, Dominion Transmission Inc. ("Dominion") submitted an application to the Federal Energy Regulatory Commission ("FERC") for a project to expand the carrying capacity of its natural gas pipeline in the State of New York. (FERC Docket No. CP14-497-000.) As proposed, Dominion's New Market Project would enable the transport of 112,000 Dekatherms of additional gas (over 100 million cubic feet) per day from the fracking regions of Pennsylvania, West Virginia, and Ohio through the company's existing 200-mile-long, 50-year old pipeline, with connections from the...
southern border of New York to Schenectady. A connection would also be built between the Dominion and Iroquois pipelines which cross in Minden, New York. The project involves new or modified facilities in six counties, including additional compressor stations in Horseheads (Chemung County) and Sheds (Madison County), and the expansion of an existing compressor station in Brookman Corners (Montgomery County). The project also involves additional facilities and modifications to existing compressor stations in Tompkins County and Herkimer County, and to a metering station in Schenectady County. FERC issued an Environmental Assessment ("EA") for the project in October 2015.

Pursuant to the federal Clean Air Act, the New York State Department of Environmental Protection ("DEC" or "the Department") is charged with reviewing air state facility permits applications for the three new and expanded compressor stations: Application ID: 8-0740-00081/00001 for the Horseheads compressor station in Veteran, New York\(^1\); Application ID: 7-2530-00033/00001 for the Sheds Compressor Station in Georgetown, New York\(^2\); and Application ID: 4-2730-00038/00001 for the Brookman Corners Compressor Station in Minden, New York\(^3\). Draft permits were released for public comment in July 2016.

The Horseheads Compressor Station requires a new Air State Facility permit for one Solar Taurus 70 natural gas turbine to provide 11,010 horsepower of compression. Three exempt micro-turbines are also proposed. The Sheds Compressor Station requires a new Air State Facility permit for one Solar Taurus 70 natural gas turbine to provide 10,880 horsepower of compression. Four exempt micro-turbines are also proposed at Sheds. The Brookman Corners Compressor Station involves the proposed modification of an existing Air State Facility permit to add a 6393 horsepower Solar Centaur 50L natural gas turbine and two 2370 horsepower Caterpillar G3608 reciprocating engines. This is in addition to an existing 7410 horsepower Solar Taurus 60 natural gas turbine already located at the site to provide a total of 18,543 horsepower of compression. The installation of coolers, additional measurement and regulation facilities, and a G3516 gas-fired backup generator to replace an older generator are also proposed at Brookman Corners.

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II. Commenting Organizations

Otsego 2000, Inc. is a non-profit historic preservation and conservation organization located in Cooperstown, New York. The organization has worked for more than 35 years to protect the significant historic, agricultural, and environmental assets of the Leatherstocking Region and is committed to sustainable development, which will protect air and water resources, and reduce negative climate impacts. The proposed expansion of the Brookman Corners compressor station threatens public health, agriculture and organic farming, historic sites, and tourism, all of which are crucial to the local economy and quality of life. Challenges raised by Otsego 2000 include insufficiency of air permit models to support the applications, inadequacy of the proposed permits to protect air quality and public health, and failure to reduce climate impacts as required by New York State and federal guidelines.

Mohawk Valley Keeper represents approximately 100 families who own homes, farms, and land surrounding the Brookman Corners compressor station, including thousands of acres in the Town of Minden and neighboring areas of Montgomery, Herkimer, and northern Otsego Counties. The organization has a diverse membership that includes many Amish families. Over the years, its members have purchased fallow farms and redeveloped them into productive businesses. Mohawk Valley Keeper supports sustainable farm practices and certified organic operations that rely on clean air, water, and soil. The area has been identified by State and federal agencies for agricultural growth and agri-tourism and contains numerous designated historic sites, including property that directly abuts the Brookman Corners compressor station. Mohawk Valley Keeper opposes Dominion's New Market Project due to its serious threat to public health, and its conflict with the rural, scenic, and historic character of the region its members cherish.

Madison County Neighbors for Environmental Preservation ("MCNEP") was founded in 2014 as a response to the state-wide issue of high volume hydraulic fracturing. A major goal of the organization has been to protect the local environment from harm caused by unrestrained industrial development in a region that is home to many family farms, growing agri-tourism, habitat for rare and endangered wildlife, and a major hiking trail. The organization supports action to reduce greenhouse gas emissions and the State's goal of providing New Yorkers with safe, reliable alternatives to fossil fuels. MCNEP has been involved in educational outreach, hosted
public informational forums, and met with government officials. Its members have also spoken with and submitted comments to FERC and the DEC. MCNEP opposes Dominion's New Market Project and the proposed compressor station in Sheds because of the threat it poses to public health, agriculture, community assets, and climate change.

**Mothers Out Front** was founded by Kelsey Wirth and Vanessa Rule in 2013 to support and empower volunteer leaders to organize around climate change issues in their local communities. The organization now has staff in three states and is building a powerful grassroots movement to ensure a swift, complete, and just transition away from fossil fuels and toward clean and renewable energy to preserve a livable climate for children. When residents sought help in fighting the Horseheads compressor station, Mothers Out Front empowered people to hold community meetings, talk to the media, and inform others about the project and the threat it poses to a community that has already been negatively impacted by gas wells and other gas infrastructure. Many of its members and allies reside near the proposed Horseheads compressor station.

Dominion's New Market Project conflicts with all of the values that Otsego 2000, Mohawk Valley Keeper, MCNEP, and Mothers Out Front support and defend. The new and expanded compressor stations would expose families and farms to unnecessarily high levels of chemical emissions. The project threatens public health and safety, agricultural, rural character, property values, economic well-being, and quality of life of communities at each compressor station site and along the pipeline corridor.

All of the commenting organizations believe that the permit applications fail to properly account for local topography and meteorological conditions, that the models used are based on data from inappropriate sites which are not representative of local conditions, that the applicant and the Department failed to account for potential adverse health impacts, that the Department has failed to require sufficient mitigation for impacts, and that the Department incorrectly interprets the limitations on state authority in light of FERC preemption. We also assert that the draft permits are based on improperly segmented review, fail to address the cumulative impacts of climate change, and that they contravene both energy and greenhouse gas reductions goals of New York. All of the organizations are asking the DEC to deny the permits for these projects.
The signatory organizations have cooperated to submit one joint set of comments. Accordingly, we request that each signatory organization be treated as having filed comments to each of the three draft permits.
III. Executive Summary

These comments, submitted on behalf of Otsego 2000, Mohawk Valley Keeper, Madison County Neighbors for Environmental Preservation, and Mothers Out Front, request that the New York State Department of Environmental Conservation (“DEC” or the “Department”) deny air permits for the Dominion New Market Project. Each signatory organization represents individuals who are adversely impacted. In addition, 90 supporting organizations have joined in support of these comments.

As proposed, Dominion's New Market Project would enable the transport of 112,000 Dekatherms of additional gas daily (over 100 million cubic feet per day) from the fracking regions of Pennsylvania, West Virginia, and Ohio through the company's existing 200-mile-long, 50-year old pipeline, from the southern border of New York to Schenectady. A connection would also be built between the Dominion and Iroquois pipelines which cross in Minden, New York. To accommodate the increased capacity, the project requires new or expanded facilities in six counties including new compressor stations in Horseheads (Chemung County) and Sheds (Madison County), and significant expansion of an existing compressor station in Brookman Corners (Montgomery County).

The Department has incorrectly determined that the federal Natural Gas Act (“NGA”) preempts its authority to review this project under the State Environmental Quality Review Act (“SEQRA”), and has incorrectly designated the permits as SEQRA Type II actions. However, State review under the Clean Air Act (“CAA”) and the Clean Water Act (“CWA”) is not preempted by the NGA; in fact the NGA expressly exempts the CAA and CWA from its terms. This includes the preemption provisions. Further, the project as a whole constitutes a significant action under SEQRA. While individual facilities might not meet the “major source” definition under the CAA, if considered together they would be a major source. Since the air permits are linked, it is appropriate to consider the entire project for the purpose of determining significance and evaluating cumulative impacts. Dominion has also agreed to be governed by State law, and has fully participated in the SEQRA process at the local level. The Department should therefore not have abandoned its authority. It should have assumed lead agency status because it is the only agency that could review the entire project.

Further, DEC guidelines require consideration of climate change in its decision-making. According to Dominion's applications, the new and expanded compressor stations would pump over 200,000 tons of greenhouse gas emissions into the air each year. However, more than 2,000,000 tons of additional carbon dioxide would be generated annually by burning all of the extra gas to be carried
in the pipeline. If fugitive methane emissions associated with extraction, processing, and delivery are taken into account, those climate impacts more than double. Current research suggests that as much as 12 percent of all methane from shale gas production may be lost to the atmosphere. It is also known that, pound for pound, methane is 86 times more potent than carbon dioxide as a driver of climate change over twenty years. These facts spell disaster unless action is immediately taken to reduce our dependency on natural gas. DEC will not be able to meet its greenhouse gas reduction goals if it approves projects that pump more carbon into the air.

The Public Trust Doctrine also makes it clear that the State has a crucial role in protecting air as a public trust resource. The role of the State in managing this resource is that of trustee for the benefit of present and future generations.

A growing body of research shows that current air quality regulations do not adequately protect the public from the negative health impacts of gas infrastructure. Significant acute and chronic health problems are experienced by people living or working near compressor stations due to elevated levels of volatile organic compounds (“VOCs”), nitrogen oxides (“NOx”), carbon monoxide (“CO”), formaldehyde, ground-level ozone, particulate matter and other hazardous air pollutants. Exposure to these chemicals can cause cardiovascular, respiratory, and neurological damage, birth defects, cancer, leukemia, infertility, burning of lungs, eyes, and throat, muscle pain, mental impairment, headaches, and a host of other ailments.

The existing regulatory process also fails to protect the public from exposure to episodic emissions. At compressor stations, these occur during blowdowns, start-ups/shut-downs, and at other scheduled or unscheduled events. Current regulations, which require testing only once every year or two are woefully inadequate and incapable of documenting, much less controlling, emission spikes that pose a serious threat to the surrounding community.

As proposed, each of the new compressor stations in Horseheads and Sheds would use a Taurus 70 turbine to produce approximately 11,000 horsepower of compression. As such, they would each be about as large as the Minisink compressor station in Orange County, NY where residents (including children) frequently experience symptoms of exposure including headaches, nosebleeds, and rashes.

At Brookman Corners, the impacts would be even more severe due to the set of equipment that Dominion plans to install. As proposed, the station would expand to 18,500 horsepower with four compressors-- four smokestacks producing about 100,000 tons per year of greenhouse gas emissions at this site. This is about twice the climate impact of Horseheads or Sheds, respectively.
The level of pollutants harmful to human health would also be several times worse, largely due to the use of reciprocating engines compressors to transfer gas onto the Iroquois pipeline. Because reciprocating engines use older piston/cylinder technology, they are notoriously leaky, resulting in the continuous escape of fugitive emissions--raw methane and VOCs--into the atmosphere. They are also less effective than turbines at propelling combustion emissions into the atmosphere. As proposed, the draft permit for Brookman Corners would also allow weaker protection against NOx than at the other sites and not require an oxidation catalyst of its existing turbine for two years.

Topography and local meteorology are also significant factors that control or limit the dispersion of emissions, which the permit applications ignore. In fact, all three compressor stations are located in valleys where temperature inversions occur. For example, the Brookman Corners compressor station is located next to the Otsquago Creek at the bottom of a valley where nighttime and early morning inversions are common and likely to trap high concentrations of pollutants close to the surface.

Dominion's modeling is highly questionable since it used ambient wind and background concentration data from sites far from its project. For Brookman Corners, Dominion used surface data from an airport in Rome, New York and upper air data from Albany. At Sheds, Dominion used surface data from Syracuse and upper air data from Buffalo. At Horseheads, surface data came from Elmira and upper air data from Buffalo. This suggests the "cherry picking" of data to obtain desired results.

Dominion has also failed to identify impacted residents. Specifically the proposed compressor stations in Horseheads and Sheds would operate in close proximity to many homes not included in information provided to the DEC. Many children, two daycare centers and homes for the disabled are located very close to the proposed Horseheads site. A 2015 map provided by Dominion depicts only 10 residences in an area where there are nearly 60. At least 11 homes were similarly excluded by Dominion for the proposed compressor station in Sheds. This could impact criteria thresholds upon which Dominion's modeling is based.

The Amish and Mennonite residents of upstate New York are another vulnerable community. Devoted by religion and culture to traditional agrarian practices, Amish and Mennonite families often spend their entire lives in a single area. Every breath they take and almost every bite of food they consume comes from the air and land immediately around them. As such, they are particularly vulnerable to airborne pollutants, as well as those that can impact soil or crops. Due to their traditional ways, many Amish and Mennonite families also do not receive regular modern medical
services. Since Amish women usually spend their time within a very limited radius, these conditions, compound the risk of in-utero exposure and permanent, congenital harm. We believe that the above factors raise Environmental Justice concerns that must be addressed.

Finally, it has recently come to our attention that Dominion may have failed to identify all emissions sources. According to information recently submitted to the town of Minden, the company plans to install micro-turbines at Brookman Corners for electricity generation, which could produce thousands of tons of additional greenhouse gas emissions annually, along with other pollutants not disclosed to DEC. If true, this would be a major omission, increasing total greenhouse gases to well over 100,000 tons per year.

We emphasize that the organizations providing comments maintain that the air emissions permits for this project must be denied because the applications are incomplete, are not supported by appropriate modeling, and because the project exacerbates climate change. If the Department nevertheless intends to issue permits, significant mitigation must be imposed to reduce impacts, including but not limited to oxidation catalysts on all exhaust stacks, SoLoNOx emission control on all turbines, and vapor recovery on all reciprocating engines. DEC should also require continuous stack and fence-line monitoring of pollutants at each facility as part of a genuine commitment to compliance and gaining a better understanding of actual exposure.

Otsego 2000, Mohawk Valley Keeper, Madison County Neighbors for Environmental Preservation, and Mothers Out Front urge DEC to deny all three permits and steer New York toward a better future
IV. The State Must Exercise Its Full Authority To Protect The Public

The Department has made several errors in its interpretation of applicable law which result in abrogation of the State’s power and duty to consider environmental impacts to protect the public. These are described below.

A. The State Has Misapplied FERC Preemption Law Resulting In An Incorrect SEQRA Type II Designation

The Department has incorrectly determined the extent to which FERC preemption limits its authority and has incorrectly designated its review of these permits as SEQRA Type II actions. New York State's authority is limited, but not eliminated, by FERC preemption under the Natural Gas Act (“NGA”).

New York had previously asserted authority to conduct the review of pipeline projects under rules similar to those applied by FERC itself. That authority was rejected in National Fuel Gas Supply Corp. v. Public Service Com., 894 F.2d 571 (2d. Cir. 1990). where the court found that the NGA had so thoroughly regulated this area that state laws, even those not in conflict with the NGA, were preempted.

However, neither the State authority to review air permit applications under the Clean Air Act (“CAA”) nor the State authority to review water quality permit applications under the Clean Water Act (“CWA”) are preempted; in fact the NGA expressly exempts the CCA and CWA from preemption, stating:

(d) Except as specifically provided in this chapter [15 U.S.C. §§ 717 et. seq.],

nothing in this chapter affects the rights of States under--

(1) the Coastal Zone Management Act of 1972 (16 U.S.C. 1451 et. seq.);
(2) the Clean Air Act (42 U.S.C. 7401 et seq.); or
(3) the Federal Water Pollution Control Act (33 U.S.C. 1251 et. seq.).


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4 The Clean Water Act.
Because of this exemption, courts have had to harmonize FERC preemption with power reserved to the states. See e.g. *Tenn. Gas Pipeline Co. LLC v. Del. Riverkeeper Network*, 921 F. Supp. 2d 381, 2013 U.S. Dist. LEXIS 21159, 180 Oil & Gas Rep. 672, 2013 WL 443979 (M.D. Pa. 2013). While the Department may not use the SEQRA process to artificially extend its review, or evade its air permitting obligations, where the review is part of established procedure for state permitting decisions, the state must exercise its rights preserved under the NGA. The same logic would apply to a State’s Clean Air Act permitting decisions.

Part of the State’s duty in issuing an air quality permit is the application of the State SEQRA, which requires that “[s]ocial, economic and environmental factors shall be considered together in reaching decisions on proposed activities” [ECL §8-0103(7)] and requires public agencies to give “due consideration... to preventing environmental damage.” [ECL § 8-0103(9)] The primary purpose of SEQRA is “to inject environmental considerations directly into governmental decision making.” *Matter of Coca–Cola Bottling, Inc. v. Board of Estimate*, 72 N.Y.2d 674, 679, 536 N.Y.S.2d 33, 35 (1988). “To the fullest extent possible the policies, statutes, regulations and ordinances of the state and its political subdivisions should be interpreted and administered in accordance with the policies set forth in” SEQRA. (ECL §8-0103(6).) In enacting SEQRA, the State Legislature intended that state and local governments ’conduct their affairs with an awareness that they are stewards of the air, water, land, and living resources, and that they have an obligation to protect the environment for the use and enjoyment of this and all future generations.” (DEC Guide for Assessing Energy Use and Greenhouse Gas Emissions in an Environmental Impact Statement, quoting 6 NYCRR §617.1(b).)

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5 The Third Circuit Court of Appeal has suggested that environmental review ordinarily relied on by the state as conditions in issuing water quality certifications fall under the NGA exemption. “The Riverkeeper alleges that PADEP relied on an incomplete environmental assessment from Transco and failed to correct the assessment’s deficiencies prior to issuing the Water Quality Certification. PADEP and Transco counter that the majority of the Riverkeeper’s arguments relate not to the issuance of the Water Quality Certification, but the issuance of the Chapter 105 Permit. We find this argument unavailing. Because the Chapter 105 Permit was a condition of the Water Quality Certification, it is inextricably intertwined with the Water Quality Certification.” *Del. Riverkeeper Network v. Sec'y Pa. Dep't of Envtl. Prot.*, 2016 U.S. App. LEXIS 14508, *52-53 (3d Cir. Aug. 8, 2016)
There are two reasons that a project may be considered a Type II action and not require SEQRA review: (1) if it does not have significant impact on the environment (which is clearly not the case for these permits); and (2) if it is subject to a comprehensive state level review under another statutory scheme. 6 CRR-NY 617.5 (“Type I/Type II Rule”) In this latter category are “actions requiring a certificate of environmental compatibility and public need under article VII, VIII or X of the Public Service Law and the consideration of, granting or denial of any such certificate.” Id. New York Public Service Law Article VII is the law that would provide thorough, State level review of the Dominion New Market Project as a whole. But that law in turn, is the very law the Second Circuit held to be preempted by the NGA, where the NGA applies. National Fuel Gas Supply Corp. v. Public Service Com., 894 F.2d 571 (2d. Cir. 1990). Preemption, therefore, may not be used to decide that an action is Type II. The State is not preempted from exercising its full authority under the CAA and the CWA. Accordingly, SEQRA review is not preempted.

As part of its final order for the project, FERC calls for cooperation between Dominion and state authorities, saying: “[A]ny state or local permits issued with respect to the jurisdictional facilities authorized herein must be consistent with the conditions of this certificate. The Commission encourages cooperation between interstate pipelines and local authorities. However, this does not mean that state and local agencies, through application of state or local laws, may prohibit or unreasonably delay the construction or operation of facilities approved by this Commission.” (FERC Docket No. CP14-497-000, Order Issuing Certificate, Issued April 28, 2016.) However, FERC preemption does not extend to the State’s authority under the CWA, CAA and Coastal Zone Management Act, and cannot extend to the State’s legal process (including SEQR review) in making its CAA permit decisions in this case. In the recent case of the Constitution Pipeline (FERC docket No. CP13-499-000), the Department correctly denied a water quality certificate for that project, exercising its authority under the CWA. The Department has the same authority to deny air quality permits for Dominion’s project under the CAA.

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6 The saving provision for CAA, CWA, and Coastal Zone Management Act decisions was incorporated into the NGA in 2005.

7 DEC denial of Constitution Pipeline Water Quality Certificate (DEC Permit# 0-9999-00181/00024), April 22, 2016 http://www.dec.ny.gov/docs/administration_pdf/constitutionwc42016.pdf
Because the three permits under consideration are being reviewed under the State's CAA authority (an authority explicitly preserved under the NGA), none of the State's CAA-related review authority is preempted.

B. The State Cannot Simply Rely On FERC’s NEPA Analysis
   — FERC Has No Clean Air Act Authority

The Natural Gas Act, as detailed above, explicitly preserves the rights and obligations of the State when exercising its Clean Air Act permitting authority. FERC has no authority to issue air permits, and, although it provided limited consideration of air impacts in its NEPA analysis, that consideration was both flawed in its underlying data and lacking the authority reserved to the State in this permitting action.

In its final order, FERC asserts: "Under NGA section 7, the Commission is obligated to authorize a project if it finds that the construction and operation of the proposed facilities is or will be required by the present or future public convenience and necessity." This demonstrates FERC's interpretation of its powers as limited to those of "public convenience and necessity" rather than environmental concerns. By contrast, the State is enabled to address harmful environmental impacts in its review under the Clean Air Act. This is reinforced by State law, including 6 NYCRR 211.1, which prohibits any action that

…shall cause or allow emissions of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration which are injurious to human, plant or animal life or to property, or which unreasonably interfere with the comfortable enjoyment of life or property. Notwithstanding the existence of specific air quality standards or emission limits, this prohibition applies, but is not limited to, any particulate,

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fume, gas, mist, odor, smoke, vapor, pollen, toxic or deleterious emission, either alone or in combination with others. *Id.* (emphasis added).⁹

Under the Clean Air Act and Clean Water Act exemptions from the NGA, New York has not just the last, but perhaps the only real opportunity to approve or disapprove a gas pipeline project based on environmental considerations.

It is also important to recognize that the determination of significance for a State SEQRA review is not the same as a "Finding of No Significant Impact" determination by FERC. New York SEQRA clearly allows significance to be determined based on potential environmental harms without regard to competing interests. By contrast, NEPA significance is a murkier metric. *See e.g.* Lang-Smith, *The Good, the Bad and the Significant – Beneficial Impacts and NEPA*, Duke Environmental Leadership Program Nicholas School of the Environment (2012).

Dominion's New Market Project, taken as a whole, clearly constitutes a significant action under SEQRA. For example, while individual facilities within Dominion's proposed project might not meet the "major source" definition under the Clean Air Act (as modeled by the applicant), if considered together they would be a major source. Since each air permit is linked to a larger project, it is appropriate to consider all three as a group for the purpose of determining SEQRA significance.¹⁰ To do otherwise invites improperly segmented review.

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⁹ While this statement appears as condition in each of the draft permits, the simple reiteration of text does not provide for implementation. Significantly, 6 NYCRR 211.1 is a separate and independent mandate from other regulations. It is also the Department’s interpretation of the Legislature’s will as expressed in New York State Environmental Conservation Law.

¹⁰ In determining significance, the following, non-exhaustive list of factors must be considered:

(i) a substantial adverse change in existing air quality, ground or surface water quality or quantity, traffic or noise levels; a substantial increase in solid waste production; a substantial increase in potential for erosion, flooding, leaching or drainage problems;

(ii) the removal or destruction of large quantities of vegetation or fauna; substantial interference with the movement of any resident or migratory fish or wildlife species; impacts on a significant habitat area; substantial adverse impacts on a threatened or endangered species of animal or plant, or the habitat of such a species; or other significant adverse impacts to natural resources;
In addition, the NEPA analysis conducted by FERC was based on limited, and in some instances, flat-out wrong information. These errors and omissions are discussed in Section VI below. The Department must undertake its own review and may not simply rely on FERC’s conclusions.

C. Dominion Has Consented To The Application of SEQRA

Dominion has applied to local government agencies for site plan approvals under local laws. In those proceedings, Dominion repeatedly made commitments to comply with local and State laws. In addition, Dominion has participated fully in SEQRA review by the local government agencies. In so doing, Dominion has expressly waived its defense of federal preemption. Courts

(iii) the impairment of the environmental characteristics of a critical environmental area as designated pursuant to section 617.14(g) of this Part;
(iv) the creation of a material conflict with a community's current plans or goals as officially approved or adopted;
(v) the impairment of the character or quality of important historical, archeological, architectural, or aesthetic resources or of existing community or neighborhood character;
(vi) a major change in the use of either the quantity or type of energy;
(vii) the creation of a hazard to human health;
(viii) a substantial change in the use, or intensity of use, of land including agricultural, open space or recreational resources, or in its capacity to support existing uses;
(ix) the encouraging or attracting of a large number of people to a place or places for more than a few days, compared to the number of people who would come to such place absent the action;
(x) the creation of a material demand for other actions that would result in one of the above consequences;
(xi) changes in two or more elements of the environment, no one of which has a significant impact on the environment, but when considered together result in a substantial adverse impact on the environment; or
(xii) two or more related actions undertaken, funded or approved by an agency, none of which has or would have a significant impact on the environment, but when considered cumulatively would meet one or more of the criteria in this subdivision.
6 NYCRR 617.7(c).
have consistently found that federal law preemption (as opposed to federal jurisdiction/forum preemption) is an affirmative defense that may be waived. See *Gilchrist v. Jim Slemons Imports, Inc.*, 803 F.2d 1488, 1496-1497, 1986 U.S. App. LEXIS 33171, *20-21, 42 Fair Empl. Prac. Cas. (BNA) 314, 41 Empl. Prac. Dec. (CCH) P36,656, 1 I.E.R. Cas. (BNA) 1053 (9th Cir. Cal. 1986). One state court, in analyzing this question, and finding that federal preemption could be waived, reasoned as follows:

In *Gilchrist v. Jim Slemons Imports, Inc.*, 803 F.2d 1488, 1496-97 (9th Cir. 1986), the Ninth Circuit held that choice-of-law federal preemption may be waived if not timely raised. Moreover, G. Gray Wilson, in his treatise on North Carolina Civil Procedure, states that federal preemption is an affirmative defense which must be pled in a responsive pleading. 2 G. Gray Wilson, North Carolina Civil Procedure § 8-6, at 143-44 (1995). In support of this proposition, G. Gray Wilson relies upon *Rehabilitation Institute v. Equitable Life Assur.*, 131 F.R.D. 99, 100-01 (W.D. Pa. 1990), aff’d, 937 F.2d 598 (3d Cir. 1991), where the federal district court for the Western District of Pennsylvania held, and the Third Circuit affirmed, that ERISA preemption was an affirmative defense that could be waived.

D. **The State Must Uphold Federal and State Policies Regarding Climate Change**

"Global climate change is one of the most important environmental challenges of our time. There is scientific consensus that human activity is increasing the concentration of GHGs in the atmosphere and that this, in turn, is leading to serious climate change. These climate changes will continue to affect the environment and natural resources of the State of New York."


The State of New York and the Department have set forth policy that mandates the consideration of climate change in their activities and decision-making.\(^{11}\) That directive is further expressed in policy developed by the Department for the review of projects under SEQRA.\(^{12}\) As described, the DEC has both the authority and the obligation to conduct a SEQRA review before issuing air quality permits. Further, an essential part of that SEQRA review is the full exploration of the direct, indirect, and cumulative impacts of the proposed action, including climate change impacts. The State's greenhouse gas policy was developed as a result of careful deliberation as well as active public comment and participation. Pursuant to that, the Department states:

DEC staff, within their areas of responsibility, are directed to **maximize the use of their existing authorities** to: reduce GHG emissions and promote energy efficiency …and engage other state agencies, local governments and stakeholders in the State's collective effort to reduce emissions and minimize the effects of climate change on public health, communities and the environment.\(^{13}\) (Emphasis added.)

The case for adherence to the goals of this policy are all the more compelling in light of

\(^{11}\) [http://www.dec.ny.gov/regulations/65034.html](http://www.dec.ny.gov/regulations/65034.html)

\(^{12}\) [http://www.dec.ny.gov/docs/administration_pdf/eisghgpolicy.pdf](http://www.dec.ny.gov/docs/administration_pdf/eisghgpolicy.pdf)

\(^{13}\) [http://www.dec.ny.gov/regulations/65034.html](http://www.dec.ny.gov/regulations/65034.html)
the fact that, because the Clean Air Act is a delegated federal program, the DEC essentially steps into the shoes of a federal entity when exercising this power. As such, the recent CEQ guidance regarding the consideration of greenhouse gas emissions in a NEPA analysis applies by extension to the State's CAA review conducted pursuant to its delegated federal law enforcement authority.

Relating to this, it is noteworthy that the DEC recently provided comments on an EA issued by FERC for the proposed National Fuel Gas Northern Access 2016 project (FERC Docket No. CP15-115-000). In a letter by DEC Project Manager Michael T. Higgins dated August 25, 2016, the Department requested that a full Environmental Impact Statement ("EIS") be performed and, referencing the CEQ guidance, identified several relevant issues with respect to climate change:

- The Department commented that greenhouse gas impacts of a project include not only emissions produced at compressor stations, but also emissions produced by gas in the pipeline when consumed, stating specifically: "The actual amount of natural gas supplied should be indicated as well as how this amount affects the estimate of cumulative greenhouse gas GHG) emissions as measured in CO2e." (Page 10.)
- The Department acknowledged the importance of direct and indirect impacts on climate change, faulting prior analysis by FERC which dismissed greenhouse gas impacts as insignificant compared to total statewide emissions, and finding that "The existence of other emissions sources in New York and Pennsylvania does not preclude the need to mitigate GHG emissions associated with [the] project." (Page 11.)
- The Department discussed the need for adequate mitigation of greenhouse gas impacts, citing from CEQ's guidance that such mitigation should include "lower GHG-emitting technology" and "capturing or beneficially using GHG emissions such as methane." (Page 11.)

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16 These are both issues for which Dominion falls short. See Section VIII of these comments on mitigation, including vapor recovery.
The Department specifically calls for an evaluation of impacts upon state programs and policies, including "consideration of the impacts of the proposed Project on New York's ability to meet its emission reduction targets, including a 40% reduction of GHGs from 1990 levels by 2030." (Pages 11-12.)

We are aware of no such analysis by DEC staff of the EA prepared by FERC for Dominion's New Market Project. While that is troubling, the above comments nevertheless demonstrate a solid grasp of the level of review that must occur. As discussed above, the Department is not preempted from conducting such a review. In fact, pursuant to the NGA and Clean Air Act, the Department has both the authority and obligation to do so.

E. The Department Must Interpret Its Obligations Consistent With The State Constitution And With Its Role As Trustee Of The Public Trust Resources

The New York State Constitution provides:

The policy of the state shall be to conserve and protect its natural resources and scenic beauty and encourage the development and improvement of its agricultural lands for the production of food and other agricultural products. The legislature, in implementing this policy, shall include adequate provision for the abatement of air and water pollution and of excessive and unnecessary noise, the protection of agricultural lands, wetlands and shorelines, and the development and regulation of water resources.(Article XIV §4.)

This Constitutional principle makes it clear that the State has a fundamental role in protecting the air of this State as a public trust resource. Scholars have suggested integration of traditional public trust doctrine into the realm of air quality. “Application of the Public Trust Doctrine to air quality concerns involves three inter-related components: 1) the enactment of laws to limit or eliminate exposure to air pollutants; 2) the use of nuisance provisions for situations in which environmental exposure limits are either lacking or insufficiently address the variety of circumstances that could create harm; and 3) the development of a research and education plan to provide a stronger basis for encouraging effective exposure reduction alternatives.”
Despite the fact that most of the Public Trust Doctrine’s history has focused on navigable waters and the seashore, the underlying principle, that there are resources owned by all, should certainly apply to something as fundamental to life as the air we breathe. Anderson, Norman M.S.P.H (2008) *The Public Trust and Air Quality* Proceedings of the Annual International Conference on Soils, Sediments, Water and Energy: Vol. 13, Article 16. Available at: http://scholarworks.umass.edu/soilsproceedings/vol13/iss1/16 (internal citation omitted). The role of the State in managing such resources is that of trustee; in other words, the interests of the beneficiaries (the people as a whole) should be paramount over private interests. Here, that should guide the State in interpreting its air quality laws--if a law can be interpreted so as to better protect the public trust resource, it should be.
V. A Comprehensive Review Of Public Health Impacts Must Occur

It is well documented that significant acute and chronic health problems have been experienced by people living or working near compressor stations due to elevated levels of volatile organic compounds (“VOCs”), nitrogen oxides (“NOx”), carbon monoxide (“CO”), formaldehyde, ground-level ozone, particulate matter and other hazardous air pollutants. Negative health effects of exposure to these chemicals include cardiovascular, respiratory, and neurological damage, birth defects, cancer, leukemia, infertility, burning of lungs, eyes, and throat, muscle pain, mental impairment, headaches, and a host of other ailments. These impacts are discussed at length in a report by Thimble Creek Research, prepared for the Madison County Department of Health and submitted in the FERC proceeding. As discussed in that report, 90% of individuals within two to three miles of compressor stations experience odors and/or adverse health effects.

Moreover, a growing body of research shows that federal air quality regulations pertaining to gas development, and the method by which permits are granted, do not sufficiently protect public health. For example, a recent report published in the journal Environmental Health found that 38% of gas infrastructure projects, including both compressor stations and gas production sites, generate concentrations of volatile compounds that greatly exceed health-based risk levels. For years, residents living near natural gas compressor stations have experienced changes in their health consistent with exposure to these pollutants, including dizziness, headaches, nosebleeds, and neurological damage. This includes at compressor station sites where air quality tests have detected pollutant levels lower than allowed in Dominion's draft permit.

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17 Madison County DOH, Comments to the FERC Concerning Docket No. CP14-497-000, Dominion Transmission, Inc., October 15, 2014. (prepared by Thimble Creek Research)
http://www.madisoncounty.ny.gov/sites/default/files/publicinformation/madison_county_doh_comments_-_docket_no._cp14-497-000.pdf


A. Review Must Not Be Limited By Inadequate Criteria

The EPA sets primary National Ambient Air Quality Standards (‘NAAQS’) for criteria pollutants that are intended to protect public health. (42 U.S.C. § 7409(b).) However this does not ensure--and cannot be presumed to ensure-- that the public is protected in all circumstances. Despite decades of federal and state regulations under the Clean Air Act, air pollution kills approximately 200,000 Americans every year.\(^\text{21}\) Further, there is substantial evidence that significant health effects are experienced as a result of criteria pollutants even in attainment areas.\(^\text{22}\)

For example, since the EPA last updated air quality standards for \(\text{NO}_2\),\(^\text{23}\) several science journals have released peer-reviewed studies cataloging previously undocumented health effects of airborne pollutants on unborn children. These studies show that babies develop serious (sometimes life threatening) defects in verifiably higher numbers when exposed to airborne pollution.\(^\text{24}\) They also show an increase in defects with rising pollution levels. In other words, rather than a cliff effect where exposure is harmless up to a certain level, they found that increases in pollution (even at lower

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\(^{23}\) The primary \(\text{NO}_2\) standard was last revised in 2010 and is currently under review. [https://www3.epa.gov/ttn/naaqs/standards/nox/s_nox_2012_fr.html](https://www3.epa.gov/ttn/naaqs/standards/nox/s_nox_2012_fr.html)

\(^{24}\) The EPA, in a settlement with oil refineries announce in July 2016, noted “Leaks, flares, and excess emissions from refineries emit hazardous air pollutants, or air toxics, that are known or suspected to cause cancer, birth defects, and seriously impact the environment. \(\text{SO}_2\) and \(\text{NO}_x\) have numerous adverse effects on human health and are significant contributors to acid rain, smog and haze.” [https://www.epa.gov/newsreleases/oil-refiners-reduce-air-pollution-six-refineries-under-settlement-epa-and-department](https://www.epa.gov/newsreleases/oil-refiners-reduce-air-pollution-six-refineries-under-settlement-epa-and-department)
levels) contribute to harm. Importantly, these findings do not come from fringe groups with a political agenda. They are from respected scientists who examine how air pollution impacts children—our most vulnerable population. It is cold comfort to a family whose child is born with congenital circulatory malformations (a defect associated with NOx exposure), to know that EPA standards were met.

With respect to air quality, one of the greatest defects in the regulatory process is the failure of both government agencies and industry to evaluate impacts resulting from exposure to intermittent, episodic emissions. At a compressor station, these occur during events such as blowdowns, start-ups/shut-downs, and at other scheduled or unscheduled times when various onsite equipment release large quantities of emissions into the air, often untracked and unreported. Current regulations that consider pollutant levels averaged over a year's time and require testing only once every year or two are incapable of documenting, much less controlling, emission spikes that could pose a serious threat to the surrounding community. Many of the chemicals from compressor stations, like formaldehyde and benzene, are toxic even at very low concentrations, so it is not difficult to understand how individuals living even miles from a site may be adversely affected when releases occur.

The interaction of chemicals in the environment is another factor overlooked in most reviews. For example, ground-level ozone--created by the interaction of NOx, VOCs, and sunlight--is a common occurrence around natural gas infrastructure sites, including compressor stations. The entire State of New York is located within the Ozone Transport Region designated by the Clean Air Act, and as such is considered a moderate non-attainment area for ozone. Montgomery and Schenectady counties are also classified as nonattainment 8-hour Ozone NAAQS as of 1997. Ground-level ozone is known to be a severe irritant to the human respiratory system (especially in children and the

25 “The results of the continuous models corroborated the quartile findings. For example, a 1-ppm increase in carbon monoxide exposure was associated with increased risk of tetralogy of Fallot (OR ¼ 3.01, 95 percent CI: 1.67, 5.42), and a 10-lg/m³ increase in PM10 exposure was associated with increased risk of isolated atrial septal defects (OR ¼ 1.33, 95 percent CI: 1.11, 1.60).” Gilboa et. al Relation between Ambient Air Quality and Selected Birth Defects, Seven County Study, Texas, 1997–2000, American Journal of Epidemiology pages 162:238–252 (2005).

26 Dominion New Market Project application to FERC, Section 9.1.1.4 "Attainment Status".
elderly). It is a leading cause of asthma, and with prolonged exposure can lead to lung and heart
disease, even premature death.\textsuperscript{27} Crop yield, water quality, and aquatic species can also be adversely
impacted by ground-level ozone.\textsuperscript{28}

Similarly, when exposed to sunlight, methane can convert to formaldehyde. Significantly, the
formaldehyde levels predicted by Dominion in its permit applications only consider equipment
emissions. If formaldehyde caused by exposure of methane to sunlight is taken into account, criteria
levels of exposure to this known carcinogen may be exceeded.\textsuperscript{29}

Volatile organic compounds, sulfur and nitrogen oxides, particulates, and ground level ozone
produced at compressor stations are all potent respiratory toxins. Moreover, their adverse health
impacts are well-established in the public record from a variety of sources including the EPA, the
Center for Disease Control ("CDC"), and a litany of independent research spanning many years.\textsuperscript{30}

\textsuperscript{27} \url{https://www.epa.gov/ozone-pollution/health-effects-ozone-pollution}

\textsuperscript{28} \url{http://www.ars.usda.gov/Main/docs.htm?docid=12462}

\url{https://www.princeton.edu/~mauzeral/papers/Avnery%20Mauzerall%20etal%20ag%202030%20AE%202011.pdf}

\url{http://jxb.oxfordjournals.org/content/early/2011/10/17/jxb.err317.full.pdf+html}

\textsuperscript{29} For example, the Egan report submitted by Otsego 2000 specifically addresses Dominion's questionable
analysis of formaldehyde, which approaches criteria limits. (See Exhibit F.) The external conversion of
methane to formaldehyde could result in those limits being exceeded.

\textsuperscript{30} See e.g., 0. Watanabe N, Oonuki Y. \textit{Inhalation of diesel exhaust affects spermatogenesis in growing
exhaust (DE) affects the regulation of testicular function in male Fischer 344 rats}. J Toxicol Environ
Health A 2001;63:115–26; Yoshida S, Sagai M, Oshio S, et al. \textit{Exposure to diesel exhaust affects the
\textit{Effect of moderate carbon monoxide exposure on fetal development}. Lancet 1972; 2: 1220–2; Singh J.
\textit{Nitrogen dioxide exposure alters neonatal development}. Neurotoxicology 1988;9:545–50; Bailey LTJ,
Johnston MC, Billet J. \textit{Effects of carbon monoxide and hypoxia on cleft lip in A/J mice}. Cleft Palate
toxicity of carbon monoxide in protein deficient mice}. Teratology 1993;48:149–59; Somers CM, Yauk
99:15904–7; Somers CM, McCarry BE, Malek F, et al. \textit{Reduction of particulate air pollution lowers the
risk of heritable mutations in mice}. Science 2004; 304:1008–10; Samet JM, DeMarini DM, Malling HV.
\textit{Do airborne particles induce heritable mutations?} Science 2004;304:971–2; Perera FP, Rauh V, Whyatt
RM, et al. \textit{Molecular evidence of an interaction between prenatal environmental exposures on birth
outcomes in a multiethnic population}. Environ Health Perspect 2004; 112:626–30; Perera FP,
As previously discussed, the Department has not only the authority, but the obligation to require better technology and set more restrictive permit conditions as necessary to prevent emissions that are harmful "notwithstanding the existence of specific air quality standards or emission limits" that have been established.\textsuperscript{31}

\textbf{B. Current Models Do Not Adequately Predict Risk}

In prior comments to FERC, Otsego 2000 and others recommended that a comprehensive health impact assessment be performed to evaluate the potential negative effects, short and long-term, to people and animals living close to and at various distances from each of the proposed compressor stations that comprise Dominion's project. Specifically, it was suggested that this include a thorough review of records and reports relating to the health impacts of compressor and pipeline emissions, as well as the projected costs of health care, lost wages, and human suffering. Instead, FERC staff prepared a report titled “Human Health Risk Assessment and Responses to Comments” (EA, Appendix B) which seemingly tries to allay public concerns with models showing that harm will not occur or that the risk to human health is small. The flaw in this is that those models turn a blind eye to real-world data that has been collected in the field, as seen in Figure 1, below.\textsuperscript{32}

\begin{flushleft}
\textsuperscript{31} 6 NYCRR 211.1
\end{flushleft}

\begin{flushright}
\textsuperscript{32} Warning Signs - Toxic Air Pollution Identified at Oil and Gas Development Sites - Results from Community Air Monitoring Reveal Chemicals Linked to Health Hazards, Coming Clean and Global Community Monitor, October 2014. \url{http://comingcleaninc.org/assets/media/images/Reports/cc-rpt-fracking%2010.14.pdf}
\end{flushright}
Each of the above compressor stations received all required federal and state approvals necessary for construction. Yet despite those approvals, data from the monitoring of air quality surrounding those sites documented emissions that frequently exceeded safe levels for risk of chronic health impacts and cancer. It is not convincing to rely on models that are inconsistent with reality. Analysis is needed to determine why actual exposures are worse than what FERC’s models predict. Detailed critiques of FERC’s EA and its Health Risk Assessment appear in comments submitted in the FERC proceeding by Otsego 2000 (Exhibits B) and the Southwest Pennsylvania Environmental Protection Agency Integrated Risk Information System.

Corrections: The Otsego 2000’s prediction of NOx reduction in the table on page 7 assumes improvements that could only occur if the Taurus 60 turbine at Brookman Corners is also equipped with SoLoNOx. Also note that the additional Centaur 50L turbine in the table on page 9 should be identified as 6393 horsepower, not 11,000 horsepower.
Health Project (SWPA-EHP)\textsuperscript{34} (Exhibit C). See also the Request for Rehearing submitted by Otsego 2000, Mohawk Valley Keeper, and John and Maryann Valentine.\textsuperscript{35} (Exhibit D.) Notwithstanding FERC’s conclusions, the Department is required to independently evaluate risks and impacts to public health.\textsuperscript{36}

C. Public Health Costs Must be Considered

As part of its review, the Department must also consider the financial consequences that inadequate protection will have on the public costs of health care. In 2014, the Office of the State Comptroller (“OSC”) weighed in on this with a report published in titled "The Prevalence and Cost of Asthma in New York State."\textsuperscript{37} Asthma is a complex disease with no known cure. Although occurrences have declined overall in New York, asthma among Medicaid recipients has risen sharply. The OSC report found that “[t]he number of New York Medicaid recipients with an asthma diagnosis rose by more than 30 percent over the five years ending in State Fiscal Year 2012-13” and the costs of treating this “common, deadly, disruptive and expensive disease” have skyrocketed. Significantly, Montgomery County--the site of the proposed expansion of the existing


\textsuperscript{35} Otsego 2000, Mohawk Valley Keeper, and John and Maryann Valentine Petition for Rehearing of Order Issuing Certificate for the Dominion New Market Project and Request for Stay of Certificate. \url{http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14266220}

\textsuperscript{36} In its Final Order, FERC wrote in footnote 155 (page 38): "NYSDEC’s air quality permitting program does not require refined air dispersion modeling for sources (including the new and modified compressor stations approved by this order) having potential emissions falling under applicable New Source Review applicability thresholds as defined in 6 NYCRR Part 231. Although NYSDEC has the authority to require dispersion modeling as it deems necessary to satisfy its permitting requirements, it did not choose to do so in this case."

\textsuperscript{37} DiNapoli, Thomas P., The Prevalence and Cost of Asthma in New York State, Office of the State Comptroller, April 2014. \url{http://osc.state.ny.us/reports/economic/asthma_2014.pdf}
Brookman Corners compressor station—is number 6 among the State’s 62 counties in asthma prevalence among Medicaid recipients. The OSC report also emphasized that:

[The] cost of asthma goes well beyond the direct expense that taxpayers bear through the Medicaid program. The disease also drives higher insurance premiums for New Yorkers with privately paid health coverage. Including Medicaid costs, the State Department of Health (DOH) recently estimated the annual overall cost of asthma in New York at $1.3 billion in direct medical costs and lost productivity. Hospitalizations account for $660 million of these costs, a 61 percent increase since 2002. (Emphasis added.)

To address these problems, the report identified the urgent need to ensure that “initiatives to address the disease are targeted as effectively as possible,” including “reducing childhood exposure to asthma triggers.” As discussed above, exposure to exhaust and other forms of air pollution are well-established potent triggers. Clearly prevention is the best medicine. It is both ethically necessary and financially prudent for the Department to require that respiratory toxins be reduced at the source.

Higher standards and better technology may be an additional expense to an applicant. However, the alternative is the expense of uncontrolled pollutants being borne by surrounding communities and the State. Recent studies have shown that the benefits of air quality controls exceed their cost by orders of magnitude when the public cost of health care is considered. It is therefore


"Based on the scenarios analyzed in this study, the costs of public and private efforts to meet 1990 Clean Air Act Amendment requirements rise throughout the 1990 to 2020 period of the study, and are expected to reach an annual value of about $65 billion by 2020. Though costly, these efforts are projected to yield substantial air quality improvements which lead to significant reductions in air pollution-related premature death and illness, improved economic welfare of Americans, and better environmental conditions. The economic value of these improvements is estimated to reach almost $2 trillion for the year 2020 a value which vastly exceeds the cost of efforts to comply with the requirements of the 1990 Clean Air Act Amendments. " Id.
appropriate for the Department to conclude that additional controls should be required. The EPA has said:

The most significant known human health effects from exposure to air pollution are associated with exposures to fine particles and ground-level ozone pollution.

...[O]ther health effects of fine particles and ozone, health effects associated with other air pollutants, and most air pollution-related environmental effects could be quantified only partially, if at all. Future improvements in the scientific and economic information needed to quantify these effects would be expected to further increase the estimated benefits of clean air programs. 39

In other words, the most significant health impacts to occur at all three of Dominion's proposed facilities will be the product of pollutants that we know these facilities will produce, but even their health impacts may not be fully quantified. What is known is that tightened air quality standards have health benefits that, outweigh their costs. Again, DEC has both the legal authority and obligation to require better control technology, well within the financial reach of Dominion, to protect surrounding communities.

D. Potential For Harm At Each Site Is Significant

All three of sites where new or expanded compressor stations have been proposed in Dominion's "New Market Project" are located in rural areas with very good air quality. 40 However, if permits are issued for the project, air quality will decline, especially for residents and communities living nearby. Further, since the entire project would enable the flow of more gas through the pipeline, Dominion's other compressor stations, such as in Borgers and Utica where no additional horsepower is proposed, would run more and reduce air quality in those places too.

As proposed, the new compressor stations proposed in Horseheads and Sheds would each use a single Caterpillar Taurus 70 turbine to provide about 11,000 horsepower of additional compression

39 Id.
40 This includes Brookman Corners, due to the fact that the compressor station there rarely operates.
in Dominion's pipeline. This is roughly equal to the size of the compressor station now operating in Minisink, New York for the Millennium Pipeline.\footnote{The Minisink compressor station uses two Centaur 50 turbines with a total of 12,000 horsepower. Emission profiles can therefore be expected to be very similar to a Taurus 70 with the same emissions controls. Both the Centaur 50 and Taurus 70 turbines are part of Caterpillar's "Solar" turbine series.}

During the summer of 2013, a team of medical doctors and scientists with the Southwest Pennsylvania Environmental Health Project (SWPA-EHP) surveyed 35 Minisink residents, including 12 children, as part of a two month study of airborne pollutants. Among participants who did not have symptoms until after the compressor became operational or whose pre-existing symptoms became worse, SWPA-EHP reported respiratory problems in 22 of 35 individuals, including 6 with nosebleeds (which can be attributed to irritation of mucous membranes caused by formaldehyde); neurological problems among 12 participants, dermatological problems (skin rashes) among 10 participants, and reduced mental health and well-being levels below normal for half.\footnote{December 9, 2016 letter from Dr. David Brown and Celia Lewis of SWPA-EHP to Deputy Commissioner Jared Snyder, Deputy Commissioner Christian Ballantyne, Jack Nasca, Chris Hogan, William Little, and Chris Lalon of DEC.} According to SWPA-EHP:

\begin{quote}
These health findings are consistent with results of health assessments conducted by EHP near shale gas development in Pennsylvania. The findings are also consistent with information from other research reported in peer-reviewed literature, including respiratory and dermatologic pathological effects (Rabinowitz 2014 and Steinzor et al., 2013)\footnote{Id.} (emphasis added)
\end{quote}

Additionally, SWPA-EHP performed air quality monitoring of fine particulate matter (PM_{2.5}) and documented high episodic exposures that were consistent with reported respiratory health effects.\footnote{Id.} Moderate levels of PM_{2.5} in the first trimester of pregnancy can double the risk of intrauterine inflammation in the first trimester, which is the leading cause of premature birth in one
out of nine babies born in the United States.\textsuperscript{45} Harvard scientists have also shown that women, when exposed to high levels of PM\textsubscript{2.5} in their third trimesters double the risk of having an autistic child.\textsuperscript{46}

Minisink has become a poster child for how regulations have failed the people of New York. Since the turbines that Dominion proposes to use in Horseheads and Sheds are very similar to those in Minisink, we can expect that nearby families and children will be exposed to comparable high levels of pollution and are likely to experience similar adverse health impacts. Albert Einstein once said "Insanity is doing the same thing over and over again and expecting different results." There is no reason to believe that using the same equipment, controls, and practices that have failed to protect public health in the past will protect it in the future.

The expansion proposed for Brookman Corners presents another set of problems, with levels of harm even more severe. Today the compressor station at Brookman Corners is a small facility with a single 7000 horsepower gas-fired turbine that runs infrequently. In fact, Dominion has reported that the facility operated only about 10\% of the time last year. However, the proposed expansion would add a second turbine, two reciprocating engine compressors, and other equipment for a total of 18,500 horsepower. The project would also create a connection to the Iroquois Pipeline, which would receive three quarters of the gas in Dominion's "New Market Project" (82,000 Dekatherms per day). Since the Iroquois Pipeline operates at a higher pressure, this means that the compressor station at Brookman Corners will run far more than today, if not continuously, exposing surrounding residents and communities downwind to much higher levels of pollutants on a regular basis.

According to Dominion's application, the Brookman Corners facility could pump 96,683 tons of greenhouse gas emissions into the air every year. This corresponds to nearly three times more greenhouse gas emissions than today if the facility's existing single turbine ran continuously. However since that turbine currently operates only about 10\% of the time, the project represents almost a 30 fold increase from today. If all fugitive emissions, blowdowns, and other sources are taken into accounted, the facility would most certainly exceed the 100,000 ton/year major source threshold. Moreover, as seen in Figure 2 below, the level of pollutants harmful to human health are

\begin{itemize}
  \item \textsuperscript{45} John Hopkins university, Study: Even a Little Air Pollution May Have Long-Term Health Effects on Developing Fetus, April 2016 http://www.jhsp.edu/news/news-releases/2016/study-even-a-little-air-pollution-may-have-long-term-health-effects-on-developing-fetus.html
\end{itemize}
projected to be much higher than the existing facility with one turbine. Again, since that turbine
operates only 10% of the time today, actual VOC emissions could increase by two orders of
magnitude with the new project.

In February 2016, Dominion supplemented its application for Brookman Corners to provide
for the installation of an oxidation catalyst on its original Taurus 60 turbine, which currently lacks
this emission control. While this would reduce pollutants levels from one turbine, the projected levels
of pollutants from the entire site (including VOCs and formaldehyde) change very little or only
modestly. For example, total VOCs at Brookman Corners would drop only about 2%, from 24.3 to
23.8 tons/year according to Dominion's own data. Compared to compressor stations in Horseheads
and Sheds (each running at full capacity), formaldehyde levels would still be 15 times higher and
VOCs would be 8 times higher. CO and NOx emission would be about three times higher.\textsuperscript{47}

This is largely due to Dominion's proposed use of reciprocating engine compressors to
transfer gas to the Iroquois pipeline. Reciprocating engines are far more polluting than modern dry-
seal turbines. Although the two G3608 reciprocating units proposed have a combined horsepower
that is less than any of the compressor turbines in the project, the levels of formaldehyde and VOCs
they would produce are an order of magnitude higher. As a result, pollutants dangerous to human
health would be much greater than at Dominion's other two facilities.

The EPA estimates that fugitive emissions can account for 24\% to 29\% of total emissions
from reciprocating engines, whereas they account for less than 5\% for centrifugal turbines.\textsuperscript{48} This is
because reciprocating engines have multiple seals and rod-packing associated with pistons and
cylinders from which leakage can occur.\textsuperscript{49} If not maintained, those seals wear down over time and
can contribute to substantial leakage. Rod-packing gas is vented at compressor stations by design,

\textsuperscript{47} This assumes the new Centaur 50L turbine will be equipped with SoLoNOx for NOx control, as
described in Dominion's original application. Unlike other draft permits for the project, the draft permit
for Brookman Corners does not specify that SoLoNOx is required on the Centaur 50L turbine. If not
required, levels of formaldehyde, CO, and NOx would all be even higher than this. (See Section VIII.)

\textsuperscript{48} Oil and Natural Gas Sector Compressors, Office of Air Quality Planning and Standards (OAQPS),
April 2014 \url{http://www.epa.gov/airquality/oilandgas/pdfs/20140415compressors.pdf} ;
See also the peer reviewed response dated June 16, 2014 by Environmental Defense Fund (Alvares,
Harriss, Lyons) \url{http://www.epa.gov/airquality/oilandgas/2014papers/attachmentr.pdf}

\textsuperscript{49} Id.
and even when subjected to regular maintenance and rod-packing replacement, reciprocating engines leak. Unlike combustion emissions, fugitive emissions are also vented at low velocity closer to the ground, typically from roof or side-wall vent pipes. As such they can play a disproportionately higher role in the public exposure to pollutants.

Reciprocating engines are less effective than turbines at propelling combustion emissions into the atmosphere too, particularly when running at reduced or variable load conditions. Because the Dominion and Iroquois pipelines operate at different pressures, and because those pressures can be expected to fluctuate depending on production, flow rates, and seasonal demand, this means that the reciprocating engine compressors at Brookman Corners would rarely function at the optimal conditions upon which the specifications in Dominion’s application were based.

Figure 2. Pollutants from Emission Sources at Brookman Corners

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Existing Turbine Compressor</th>
<th>Additional Turbine Compressor</th>
<th>Additional Reciprocating Compressors</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>Taurus 60 7410HP (tons/year)</td>
<td>Centaur 50L 6393HP (tons/year)</td>
<td>2 x Cat G3608 2370HP each (tons/year)</td>
<td>Cat G3516 standby gen (tons/year)</td>
</tr>
<tr>
<td>VOC</td>
<td>-0.9- 0.5</td>
<td>0.4</td>
<td>14.4</td>
<td>0.6</td>
</tr>
<tr>
<td>CO</td>
<td>-17- 1.8</td>
<td>1.6</td>
<td>12.6</td>
<td>2.3</td>
</tr>
<tr>
<td>NO₂</td>
<td>27.9</td>
<td>14.4</td>
<td>22.9</td>
<td>1.2</td>
</tr>
<tr>
<td>PM-10/PM-2.5</td>
<td>4.6</td>
<td>3.9</td>
<td>4.6</td>
<td>0.1</td>
</tr>
<tr>
<td>SO₂</td>
<td>0.5</td>
<td>0.4</td>
<td>0.23</td>
<td>0.003</td>
</tr>
<tr>
<td>GHG</td>
<td>35,676</td>
<td>30,779</td>
<td>24,439</td>
<td>277</td>
</tr>
</tbody>
</table>

Source: Resource Report #9, Table 9.1-16 and supplemental data submitted to DEC on February 2, 2016
Note: 8760 hours/year operation for all equipment, except the standby generator at 500 hours/year.

* include 8.0 tons/year for fugitive emissions
** includes 5,512 tons/year for fugitive methane emissions

NOTE: Edits indicate the result of adding an oxidation catalyst on the Taurus 60 turbine according to Dominion. This is not proposed as an immediate change.
VI. Climate Change Impacts Can Not Be Ignored

The need for bold, swift action to combat climate change is indisputable. The August 1, 2016 Final Order of the NYS Public Service Commission (PSC) adopting a Clean Energy Standard puts this in stark perspective:

For New York, the need and ability to take steps to combat climate change is immediate. New York’s vulnerability to extreme weather events was vividly illustrated in 2011 and 2012 by the storms Sandy, Irene, and Lee. These storms, however, were only the most visible warning signs. Climate change will cause not only sea level rise, heat waves, and extreme weather events, but also threatens massive economic and lifestyle disruption from damage to agriculture, water resources, public health, energy and communication systems, and the natural ecosystems that define and support communities.

These are not sensational claims. They are profound warnings backed by a preponderance of research and the support of climate scientists around the globe. In fact, the current rate of sea ice decline and other indicator of climate change have outpaced many models and the consequences are noticeable to even the most strident climate-denying sceptics.

Although far more action is needed, world leaders have begun to respond. The COP21 Paris accord adopted last year commits the United States and other nations to cutting greenhouse gas emissions sufficient to limit global warming to 2°C, and it encourages action to limit global warming to 1.5°C. Recognizing the serious threat of climate change, New York State has also set climate goals. In 2009, Governor Paterson signed Executive Order 24, which called for an 80% reduction in greenhouse gas emissions from 1990 levels by 2050. This is further supported by 2030 goals set forth in the 2015 New York State Energy Plan. These include the reduction of greenhouse gas emissions 40% statewide from 1990 levels, meeting 50% of the state’s electricity needs with renewables, and improving energy efficiency statewide by 600 trillion BTU’s.

Nonetheless success is not measured by simply setting goals. It requires real action that translates to a significant, verifiable reduction in greenhouse gas emissions. The state’s Clean Energy Standard, if fully implemented, has the potential to modestly reduce greenhouse gas emissions from
the electricity sector, however this represents less than a quarter of the state’s carbon footprint. Greater leadership is needed for New York to achieve its climate goals. The inescapable truth is that significant cuts must be made in fossil fuel use from each sector of the economy, and adding new emission sources will only make matters worse.

To that end, Dominion's "New Market Project" is a major step in the wrong direction. According to information contained in air permit applications to the DEC, the three new or expanded compressor stations in Dominion's project would pump over 200,000 tons of greenhouse gas emissions into the air each year. However, more than 2,000,000 tons of additional carbon dioxide will be generated annually by burning all of the extra natural gas to be carried in the pipeline.\(^{50}\) If fugitive methane emissions associated with extraction, processing, and delivery are taken into account, those climate impacts more than double. Current research suggests that as much as 12 percent of all methane from shale gas production may be lost to the atmosphere.\(^{51}\) It is also known that, pound for pound, methane is 86 times more potent than carbon dioxide as a driver of climate change over twenty years. These facts spell disaster unless action is immediately taken to reduce our dependency on natural gas.

In its 2015 Finding Statement prohibiting high-volume hydraulic fracturing (HVHF) in New York, DEC specifically acknowledged the negative contribution of natural gas to climate change, stating:

\(^{50}\) According to the Energy Information Administration (EIA), natural gas produces 117.1 pounds of CO\(_2\) per 1000 cubic feet of gas when burned. [https://www.eia.gov/environment/emissions/co2_vol_mass.cfm](https://www.eia.gov/environment/emissions/co2_vol_mass.cfm)

[T]he consumption of fossil fuel, including natural gas, to produce energy contributes to climate change… [N]atural gas has the potential to undermine the deployment of various types of renewable energy and energy efficiencies, thereby suppressing investment in and use of these clean energy technologies.\textsuperscript{52}

Yet despite the state's wise decision to prohibit HVHF, New York has become increasingly dependent on fracked gas. Dominion's "New Market Project" is emblematic of this. It is a problem that will only be solved by a decisive course correction.

Reducing greenhouse gas emissions requires using less fossil fuels, not more, and achieving a 40\% reduction from all sectors of the economy by 2030, as well as a 80\% reduction by 2050, will require very deep cuts, consistently applied over time. Expanding the use of natural gas—which this project does—flies directly in the face of that. There is simply no room for the continued expansion of natural gas infrastructure, if New York's ambitious climate goals are to be met.

\textsuperscript{52} 2015 Findings Statement on SGEIS for HVHF, page 18.
VII. Information Supporting The Air Permits Is Incomplete, Inaccurate, And Misleading

We believe Dominion has provided incomplete, inaccurate, and misleading information to the Department in support of their air permits applications. This is cause for the Department to revoke its "Notice of Complete Application" and deny applications for each of the three requested air permits. It is also ample reason to require improved control technology if permits are granted.

A. Unique Topography And Meteorological Conditions Have Not Been Properly Addressed And Modeled

As part of its review, the Department must consider unique conditions including local topography and weather patterns, the spatial distribution of homes and property, and how these factors interact with components of the proposed project. Dominion's modeling failed to use representative data, as required, and is thus legally insufficient. The draft air permits, relying on those models, should not be issued.

Topography and local meteorology are significant factors which control dispersion of emissions. All three compressor stations are in valleys where temperature inversions occur. Approximately 200 feet from Otsquago creek, the Brookman Corners compressor station is in the center of a drainage basin formed by the Otsquago Valley, which extends from Van Hornesville to the village of Fort Plain. (See Figures 4 and 5 below.) At night, air can stabilize above cooler waters of the creek, creating a temperature inversion that causes emissions to settle in the valley. This is supported by the frequent observation of fog that persists well into the late morning over Otsquago Creek and envelopes surrounding land. (See Figure 3). Furthermore, the top of four proposed exhaust stacks at the facility would be at a lower elevation than the valley rim, which could concentrate emissions for longer periods of time near the surface and eventually carry them downwind to Fort Plain. As previously discussed, this is a particular concern for reciprocating compressors that produce more fugitive emissions vented at low velocity near the ground, and which are less effective at

53 According the SWPA-EHP, at Minisink "Period of low wind speed and nighttime (especially early morning hours) were found to increase potential exposures to PM2.5 and any associated chemicals at residences near the compressor station." Southwest Pennsylvania-Environmental Health Project, Summary of Minisink Monitoring Results.
propelling combustion emissions into the atmosphere (especially under varying load conditions). Dominion has failed to consider these factors in its analysis, instead modeling dispersion based on wind patterns from distant locations with significantly different topography.

**Figure 3. Fog over the Otsquago Creek at the Brookman Corners Compressor site**

(The Brookman Corners compressor station is located directly behind trees on the left side of the picture. Photo by John Valentine.)
Figure 4: Topography of Minden and Otsquago Creek Valley showing location of Brookman Corners Compressor Station


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Figure 5: Generalized Geologic Cross-Section of Minden and Otsquago Creek Valley

The proposed Horseheads compressor station is also sited in a topographic depression. (See Figure 6.) Chemung Valley is recognized for its temperature inversions and is a study location for this meteorological phenomenon.\textsuperscript{54} At the public hearing for the Horseheads compressor station permit on August 30, 2016, a local retired Navy pilot offered his analysis of the data Dominion had used. He pointed out that the topography is among the most challenging for flying because of the wind change in hilly areas. He also discussed the frequent temperature inversions which hold air down in the valley. As a professional with extensive training and real world experience he spoke about the negative impacts of temperature inversions holding emissions at the ground level in the Persian Gulf. His opinion was that the data Dominion chose was not representative. The written testimony of Geoff Marshall is enclosed as Exhibit E.\textsuperscript{55}

\begin{quote}
Temperature inversions creating ground fog in this area have been both documented and studied, and this information should have been examined either in the model quantitatively, or in a qualitative discussion to explain how pollutant dispersion would work in an area where the overnight air is held still until daylight warming. If lack of dispersion is not addressed, residents will be sleeping as pollutants are held down in the air they breathe overnight. Due to circadian variations, as well as the use of medications, human oxygen levels tend to drop overnight--thus the highest levels of interference with breathing will occur during the most dangerous times of day.
\end{quote}

\textsuperscript{54} http://journals.ametsoc.org/doi/abs/10.1175/1520-0450(1975)014%3C0347%3ATLCOVF%3E2.0.CO%3B2

\textsuperscript{55} Written comments by Geoff Marshall, retired Navy test pilot https://drive.google.com/open?id=0B4L50jZxbrLBNU42bFY1SIB4eTA
These failings have been raised with the Department through an expert report prepared by Egan Environmental, Inc. and other material previously submitted by Otsego 2000.⁵⁶ (Exhibit F.) As to the other sites, we believe that those permit applications contain similar errors. The primary responsibility is on the applicant and the Department to, respectively, develop and require all necessary information. We do not have a similar level of detailed analysis for each site; however the concerns are analogous and we offer that report as a critique of all three permits.

Significantly, each of the three permit applications rely on wind data from airports that are far removed from the respective compressor station sites. While it may be that airports provide the most readily available data, and are therefore more convenient to feed into an AERMOD model, Dominion has not demonstrated that this borrowed wind data sufficiently represents ground conditions at each site. At the Brookman Corners facility, Dominion’s model utilized surface data from an airport in

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Rome, New York and upper air data from Albany.\textsuperscript{57} At Sheds, Dominion used surface data from an airport in Syracuse and upper air data from Buffalo.\textsuperscript{58} The Horseheads compressor station model was run with surface data from an airport in Elmira, New York and upper air data from Buffalo.\textsuperscript{59} This haphazard selection suggests the "cherry picking" of data to obtain desired results.

Although not uncommon, the general practice of using airport wind data may lead to a serious overestimate of dispersion and, therefore, an underestimate of air quality impacts. Airports are intentionally built in flat areas with light and predictable winds. That makes them good for flying airplanes, but it makes them very poor representatives of hilly terrain with conditions like that of Dominion's proposed compressor station sites.

In order to evaluate Dominion's claim that data from "representative" locations were used, a professional photographer and his assistant simultaneously documented conditions in Minden, NY and the airport in Rome, NY on September 7, 2016. Consistent with past observations as a photographer in the area, he found that morning fog persisted for hours in Minden where the Brookman Corners compressor station is located, while the air was complete clear in Rome. His report with accompanying photographs is enclosed as Exhibit G.\textsuperscript{60}

Dominion has been on notice since May 2015, when the Egan report was submitted, that there were serious concerns as to whether the wind data it had offered was representative of actual conditions. For a few hundred dollars, Dominion could have purchased and installed meteorological equipment at each compressor station site and collected data to use in its modeling or confirm that the airport sites that it had picked were sufficient. This is not rocket science, and certainly not unreasonable for a company prepared to spend over $159 Million on its project. The Department

\textsuperscript{57} \url{https://www.dom.com/library/domcom/pdfs/gas-transmission/new-market/brookmancorners-air-permit-application.pdf?la=en}

\textsuperscript{58} \url{https://www.dom.com/library/domcom/pdfs/gas-transmission/new-market/sheds-air-permit-application.pdf}

\textsuperscript{59} \url{https://www.dom.com/library/domcom/pdfs/gas-transmission/new-market/horseheads-air-permit-application.pdf}

\textsuperscript{60} Scalia-Nellis Report and Photographs from Minden, NY and Rome, NY \url{https://drive.google.com/open?id=0B4L50jZxbRLBOEYkcmgxSIptN1U}
should not consider issuing any air permits until Dominion has gone back and ground-truthed its model inputs.

Dominion also obtained air quality data for criteria pollutants from areas that are far removed from its project. For example, background concentrations of NO\textsubscript{2} for Brookman Corners were based on air data from Amherst, NY, which is more than 200 miles west of the site.\textsuperscript{61} In his report, Egan states that this is "clearly too far away to provide a credible 1-hr background value." As with wind, the arbitrary selection of reference concentrations suggests a cherry-picking of information to obtain favorable results when incorporated into Dominion's models. In summary, Egan states:

[T]he closeness of predicted concentrations of NO\textsubscript{2}, PM2.5, and formaldehyde to the corresponding national ambient air quality standards and state guideline concentrations for HAPs raises serious questions about compliance. DTI has relied on inadequate background data. In addition, DTI has not collected site-specific meteorological data and has not provided any indication that it intends to conduct follow-up ground truth monitoring of pollutant concentrations after emissions increase. All of these concerns undermine the robustness and reliability of DTI's compliance demonstrations.

The Egan report also discusses several inadequacies in the methodology of Dominion's modeling which are described as "non-conservative." Combined with non-representative meteorological data, Egan concludes that Dominion's modeling is "inadequate to clearly demonstrate compliance with the NAAQS for NO\textsubscript{2}, for PM2.5 and HAPs regulations for formaldehyde." He also states that because projected pollutant levels exceed Significant Monitoring Concentration (SMCs) and De Minimus Monitoring Levels (DMLs) at Brookman Corners, and since Dominion has not made "an acceptable showing that representative existing ambient air monitoring data exists in the area" pursuant to Section 231-12.4 of DEC regulations, that pre-construction ambient air monitoring should be required.\textsuperscript{62}


\textsuperscript{62} The need for site-specific monitoring is underscored by the narrow margins of compliance claimed by Dominion. See discussion of formaldehyde on page 4 of Egan's report.
As discussed above, the Egan report was produced in May, 2015, which was over a year ago. Dominion could have collected representative air and meteorological data onsite over the past 12 months to corroborate its analysis, but failed to do so. The public should not pay the price for Dominion’s lack of due diligence. Pursuant to Section 231-12.4, the Department should require that preconstruction onsite monitoring be performed to obtain credible data, followed by refined air-quality modeling. In light of significant doubt in the credibility of Dominion’s data and the narrow margins by which the project meets certain pollutant criteria, DEC should perform its own independent modeling as well. Again, the Department should not consider issuing any air permits unless and until these steps are taken.

B. **Vulnerable Communities Have Not Been Properly Counted And Considered**

The State of New York, acting through the DEC, must consider the potential health impacts of Dominion’s project on surrounding communities, including sensitive populations. This requires an accurate inventory of all homes, schools, and other land uses surrounding each compressor station site.

Dominion has failed to properly identify impacted residents in the vicinity of its project, including within the 1.5 mile radius of high-sensitivity required for agency review. Specifically the proposed compressor stations in Horseheads and Sheds would operate in close proximity to many homes not included in material and maps provided to the DEC. Many children (two home daycares and a family with seven children), as well as elderly residents live within a half mile of the proposed Horseheads site. The map submitted by Dominion in 2015 depicts only ten homes in this same area where nearly sixty actually exist. As seen in the following two aerial photographs, the vast majority of impacted residents were simply never counted. This is a major omission. At least eleven homes were similarly excluded from material submitted by Dominion for the proposed compressor station in Sheds. Failing to accurately identify homes in the immediate vicinity could impact criteria thresholds upon which Dominion's modeling is based. This must be investigated.
Figure 7: Homes identified by Dominion surrounding the Horseheads compressor station

Figure 8: Actual homes surrounding the Horseheads compressor station
In addition, the Horseheads compressor station site is located near several community homes for the disabled that are operated by ABLE2 Enhanced Potential, Inc. The closest of these is within 0.8 miles of the site. Serious concerns regarding impacts of the compressor station on ABLE2 residents were expressed by the company's Director of Environmental and Fleet Services, Adam Hungerford, at the public hearing in Corning on August 29, 2016. A letter by the Executive Director of ABLE2 has also been submitted for the record.63 (Exhibit H.). Dominion has suggested that it could provide limited notice of certain events, such as scheduled blowdowns. However disable residents may not have the ability to simply leave when such events occur. They will be essentially captive to the toxic emissions that Dominion emits. Further, since the residents of these community homes near the facility may already have compromised health, they will be particularly susceptible to harm from both scheduled and unscheduled releases.

The compounding aspects of harm must be considered as well. For example, near the proposed Horseheads compressor station, local children are already attending schools where past regulations have failed. The Corning Painted Post High School and other surrounding schools have soils contaminated with lead, cadmium or arsenic at concentrations above the state's soil cleanup objectives for residential settings.64 Elmira High School sits atop of another cleanup site, contaminated with PCBs and petroleum related compounds.65 Elmira is also an identified environmental justice community. Local residents in the Corning study area are advised (among other things) to remove shoes and brush off clothing before entering the home to prevent contaminated soil from being brought indoors. It is simply unacceptable and inexcusable to add to the host of risks already present in the lives of these children. In addition, because these locations are within commuting distance, it is reasonable to assume that some people are traveling from contamination, to contamination, exposure to exposure. We must stop failing them.

The Amish and Mennonite residents of upstate New York are another particularly vulnerable community impacted by Dominion's project, particularly at Brookman Corners and Sheds where many live in the immediate vicinity. Devoted by religion and culture to traditional agrarian practices, Amish and Mennonite families often spend their entire lives living and working

63 ABLE2, Enhancing Potential, Inc. Letter to DEC, September 9, 2016. https://drive.google.com/open?id=0B4L50jZxbrLBTrke1WE9aTTRrYms

64 http://www.dec.ny.gov/chemical/97180.html

65 http://www.dec.ny.gov/chemical/102390.html
within a single area. Every breath they take and almost every bite of food they consume comes from the air and land immediately around them. As such, they are particularly vulnerable to airborne pollutants, as well as to pollutants which may impact soil or crops (like nitrogen oxide). Furthermore, because they have large families, many Amish and Mennonite residents in the region are children. (More than ten children per family is not uncommon.) In fact, four Amish schoolhouses are located very close to Dominion’s proposed project at Brookman Corners and at least two Amish schools are located near the proposed Sheds site. It is well established that children are particularly sensitive to toxins in the environment, because of their immature and sensitive respiratory, kidney, and endocrine systems. Due to their traditional ways, many Amish and Mennonite families also do not receive regular modern medical services. Since Amish mothers (including pregnant mothers) usually spend their time within a very limited radius, these conditions, combined with a lack of modern prenatal care, compound the risk of in-utero exposure and permanent, congenital harm.

Due to the unique historic, ethnic, and economic conditions of impacted Amish and Mennonite communities, we believe that the above factors constitute a bona fide Environmental Justice concern.

Such facts demand careful consideration. These are communities and children for whom we are responsible. The State of New York must act now to minimize public exposure to pollutants from Dominion's project and other impacts of the facility.

C. Dominion Failed to Disclose All Emission Sources

It has recently come to our attention that Dominion may have failed to identify all emissions sources that contribute to the total levels of criteria pollutants and greenhouse gas emissions at its facility in Brookman Corners. If so, this would increase total emissions at that location and for the entire project in excess of levels identified previously to FERC and DEC. As such it may also affect whether Title V criteria for a Major Source is triggered.

In its project application to FERC and in the individual applications for Air State Facility permits to DEC, Dominion tabulated emission sources for each of the three compressor stations. For Horseheads, this included a Taurus 70 turbine for gas compression and three Capstone 200 micro-

turbines for on-site electricity generation. For Sheds, this included a Taurus 70 turbine for compression and four Capstone 200 micro-turbines for electricity. For Brookman Corners, Dominion identified its existing Taurus 60 compressor turbine, a Centaur 50 compressor turbine, two reciprocating engines, and an onsite backup generator. Unlike Horseheads and Sheds, no micro-turbines were identified at Brookman Corners for electricity in Dominion's application to FERC or DEC. (See Figures 9 for Horseheads and Figure 10 for Brookman Corners.)

However according to information considered by the Planning Board of Minden, New York on August 29, 2106 as part of its local State Environmental Quality Review (SEQR), Dominion does in fact intend to install micro-turbines at Brookman Corners for electricity. Although excluded from information submitted to DEC and FERC, information regarding the use of micro-turbines appeared in Part 1 of the SEQR Environmental Evaluation Form (EAF) provided by Dominion to the Minden Planning Board. (See page 7 of the Brookman Corners local EAF form in Figure 11.) Specifically, Dominion states in its answer to Question D2(k)(i) and (ii):

k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy [ ] Yes [ ] No

If Yes:

i. Estimate annual electricity demand during operation of the proposed action:

Natural gas from the existing pipeline will be used to operate the new station. The estimated annual electricity demand is ~4,678 MW-h (per year).

ii. Anticipated sources/suppliers of electricity for the project (e.g., onsite combustion, on-site renewable, via grid/local utility, or other):

On-site combustion using micro-turbines. Electricity for normal operation of the facility will be generated on-site using natural gas powered microturbines. Back-up electricity will be provided by the local utility. It is anticipated that less than 1000kW-h of energy will be required annually from the local utility.

In this manner, Dominion revealed for the first time that it plans to use micro-turbines at Brookman Corners to generate 4678 Megawatt-hours (MWh) of electricity annually. Based on Part 1 the SEQR-EAF form submitted to the Planning Board of Horseheads, it is known that the three Capstone C200 micro-turbines proposed there are estimated to produce 1147 MWh of electricity annually. It is also known from the Horseheads application to DEC that each Capstone C200 turbine
will produce 1180 tons of carbon dioxide equivalents, as well as other criteria pollutants. (See Figure 9.)

The amount of electricity that Dominion plans to produce from micro-turbines at Brookman Corners is about four times higher than at Horseheads according to information submitted to Minden. Therefore the total amount of emissions from those micro-turbine emissions can be expected to be about four times higher too. This could amount to more than 14,000 tons of additional greenhouse gas emissions annually, in addition to other criteria pollutants including formaldehyde, VOCs, CO, and NOx that Dominion failed to disclose. Added to greenhouse gas emission that Dominion included in its application, this could amount to more than 111,000 tons of greenhouse gas emissions annually, which exceeds the PSD criteria threshold.

If the information submitted to Minden is correct, this is a very serious omission. It is also highly suspect, considering that Dominion’s total projected emissions were only slightly under the 100,000 ton/year PSD criteria for Title V review when its application was originally submitted to FERC in 2014. If Dominion intends to use micro-turbines at Brookman Corners, the Department would have good cause to rescind its "Notice of Complete Application" that was issued on July 6, 2016. Furthermore, since micro-turbine emissions were not factored into Dominion’s estimate of impact, modeling would also have to be repeated with correct and complete information. In this case, FERC should also be notified that the information it was given, and which contributed to its determination, was incorrect.

This is further evidence that Dominion’s data requires scrutiny and cannot be accepted at face value. We urge the Department to perform its own independent evaluation and modeling of impacts at Brookman Corners and Dominion’s other proposed compressor station sites.

In addition to the above, it does not appear that Dominion completely identified and accounted for other emission sources and modes of emissions release (such as other exempt equipment, leakage, and blowdowns) in its calculation of total greenhouse gas emissions and pollutants dangerous to human health. In order to fully consider impacts and the various methods by which the public may be exposed, short and long term, these must be fully identified and analyzed.

67 We do not know if Capstone C200 turbines are proposed for Brookman Corners, like at Horseheads and Sheds. But if so, this could require up to twelve units, each producing 1180 tons/year of GHG, or a total of 14,160 tons/year.
Figure 9: Horseheads Compressor Station Emissions

Table 2 - Project Emissions

<table>
<thead>
<tr>
<th>Solar Taurus 70</th>
<th>Exempt Gas Units</th>
<th>Microturbines</th>
</tr>
</thead>
<tbody>
<tr>
<td>11,010 hp max rating</td>
<td>AO Smith ProMax</td>
<td>3 Capstone C200</td>
</tr>
<tr>
<td>at 0 deg F Carrier Furnace</td>
<td>(Data is for each of 3 units)</td>
<td></td>
</tr>
<tr>
<td>Max hourly firing rate (MMBtu/hr)</td>
<td>92.7</td>
<td>2.7</td>
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<tr>
<td>Hours per year for PTE</td>
<td>8760</td>
<td>8750</td>
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<tr>
<td>MMBtu/year</td>
<td>812,315</td>
<td>23,652</td>
</tr>
<tr>
<td>kW/2</td>
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<td></td>
</tr>
<tr>
<td><strong>Nitrogen Oxides (NOx)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ppmv at: 15% O2</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>lb/MMBtu</td>
<td>0.055</td>
<td>0.088</td>
</tr>
<tr>
<td>lb/MMBtu</td>
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<td></td>
</tr>
<tr>
<td>tons/year</td>
<td>22.3</td>
<td>1.0</td>
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<tr>
<td><strong>Carbon Monoxide (CO)</strong></td>
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<tr>
<td>ppmv at: 15% O2 (with 90% control)</td>
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<tr>
<td>lb/MMBtu</td>
<td>0.006</td>
<td>0.037</td>
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<tr>
<td>lb/MMBtu</td>
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<td></td>
</tr>
<tr>
<td>tons/year</td>
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<td><strong>PM-10/PM-2.5</strong></td>
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<td>Solar maximum lb/hr case</td>
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<td>lb/MMBtu</td>
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<td>0.0048</td>
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<td>lb/MMBtu</td>
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<td></td>
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<tr>
<td>tons/year</td>
<td>5.1</td>
<td>0.06</td>
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<tr>
<td><strong>Volatile Organic Compounds</strong></td>
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<td>PM-10/PM-2.5</td>
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<td>lb/MMBtu</td>
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<td>lb/MMBtu</td>
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<tr>
<td>tons/year</td>
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<tr>
<td><strong>Sulfur Dioxide (SO2)</strong></td>
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<tr>
<td>lb/MMBtu (0.5 gr/s/100 scf)</td>
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<tr>
<td>lb/MMBtu</td>
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<td></td>
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<tr>
<td>tons/year</td>
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<tr>
<td><strong>Formaldehyde</strong></td>
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<td>Solar maximum lb/hr case</td>
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<td>lb/hr with 90% control</td>
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<tr>
<td>lb/MMBtu (AP-42)</td>
<td>7.35E-05</td>
<td>0.00071</td>
</tr>
<tr>
<td>tons/year</td>
<td>0.11</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Sum of All Other HAPs</strong></td>
<td></td>
<td></td>
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<tr>
<td>AP-42 lb/MMBtu</td>
<td>3.17E-04</td>
<td>0.0018</td>
</tr>
<tr>
<td>Assume 75% oxidization catalysts control</td>
<td>7.93E-05</td>
<td></td>
</tr>
<tr>
<td>tons/year</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Total HAPs (tons/year)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Total HAPs includes 0.1 tpy for fugitive emissions; 0.0093% of CO2e from methane)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GHG as CO2e</strong></td>
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<td></td>
</tr>
<tr>
<td>lb/MMBtu</td>
<td>117.1</td>
<td>117.1</td>
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<tr>
<td>lb</td>
<td>47,830</td>
<td>1,385</td>
</tr>
<tr>
<td>tpy</td>
<td></td>
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<tr>
<td>(CO2e includes 1,195 tpy of CO2e for fugitive methane emissions)</td>
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<td></td>
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</tbody>
</table>

3 x Capstone 200 micro-turbines
3540 tons/year GHG total
Figure 10: Brookman Corners Compressor Station Emissions

(NO MICRO-TURBINES SHOWN)

<table>
<thead>
<tr>
<th>Table 2 - Brookman Corners Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Centaur SOL</td>
</tr>
<tr>
<td>6,993 hp max rating</td>
</tr>
<tr>
<td>at 0 deg F</td>
</tr>
<tr>
<td>Max hourly firing rate (MMBtu/hr HHV)</td>
</tr>
<tr>
<td>Hours per year for PTE</td>
</tr>
<tr>
<td>MMBtu/year</td>
</tr>
<tr>
<td>kWe</td>
</tr>
<tr>
<td>hp</td>
</tr>
</tbody>
</table>

Nitrogen Oxides (NOx)

<table>
<thead>
<tr>
<th>ppmv at 15% O₂</th>
<th>Total</th>
<th>Major Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/MMBtu</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>grams/bhp-hr</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>25</td>
<td>25 tons/year</td>
</tr>
<tr>
<td>0.055</td>
<td>0.146</td>
<td>0.092</td>
</tr>
<tr>
<td>0.5</td>
<td>2.0 (NSPS)</td>
<td></td>
</tr>
<tr>
<td>14.4</td>
<td>22.9</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Carbon Monoxide (CO)

<table>
<thead>
<tr>
<th>ppmv at 15% O₂ (with 90% control)</th>
<th>Total</th>
<th>Major Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/MMBtu</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>grams/bhp-hr</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>0.006</td>
<td>0.080</td>
<td>0.006</td>
</tr>
<tr>
<td>0.015</td>
<td>0.03</td>
<td>0.015</td>
</tr>
<tr>
<td>1.6</td>
<td>12.6</td>
<td>2.3</td>
</tr>
</tbody>
</table>

PM-10/PM-2.5

<table>
<thead>
<tr>
<th>Solar maximum lb/hr case</th>
<th>Total</th>
<th>Major Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/MMBtu</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>grams/bhp-hr</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>0.9</td>
<td>1.04</td>
<td></td>
</tr>
<tr>
<td>0.015</td>
<td>0.03</td>
<td>0.015</td>
</tr>
<tr>
<td>1.6</td>
<td>14.4</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Volatile Organic Compounds

<table>
<thead>
<tr>
<th>Solar maximum lb/hr case</th>
<th>Total</th>
<th>Major Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/MMBtu</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>grams/bhp-hr</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>0.18</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>0.0015</td>
<td>0.09</td>
<td>0.015</td>
</tr>
<tr>
<td>0.315</td>
<td>1.0 (NSPS)</td>
<td></td>
</tr>
<tr>
<td>0.4</td>
<td>14.4</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Sulfur Dioxide (SO2)

<table>
<thead>
<tr>
<th>Solar maximum lb/hr case (0.5 gr/5/100 scf)</th>
<th>Total</th>
<th>Major Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/MMBtu</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>grams/bhp-hr (G3608 Cat data)</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>0.0015</td>
<td>0.0015</td>
<td>0.0015</td>
</tr>
<tr>
<td>0.23</td>
<td>0.03</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Formaldehyde (maximum individual HAP)

<table>
<thead>
<tr>
<th>Solar maximum lb/hr case</th>
<th>Total</th>
<th>Major Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/hr with 90 % control</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>grams/bhp-hr (G3608 Cat data)</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>0.17</td>
<td>0.197</td>
<td></td>
</tr>
<tr>
<td>0.017</td>
<td>0.020</td>
<td></td>
</tr>
<tr>
<td>0.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.07</td>
<td>1.2</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Sum of All Other HAPs

<table>
<thead>
<tr>
<th>Solar maximum lb/MMBtu</th>
<th>Total</th>
<th>Major Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP-42 lb/MMBtu</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>Assume 75% oxidation catalyst control</td>
<td>tons/year</td>
<td></td>
</tr>
<tr>
<td>3.17E-04</td>
<td>0.0194</td>
<td>0.0194</td>
</tr>
<tr>
<td>7.93E-05</td>
<td>4.85E-03</td>
<td>7.93E-05</td>
</tr>
<tr>
<td>0.02</td>
<td>0.76</td>
<td>0.04</td>
</tr>
<tr>
<td>Total HAPs (tons/year)</td>
<td>0.10</td>
<td>1.9</td>
</tr>
</tbody>
</table>

(GHGs as CO2e)

<table>
<thead>
<tr>
<th>Total</th>
<th>Major Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/MMBtu</td>
<td>tons/year</td>
</tr>
<tr>
<td>117.8</td>
<td>156.2</td>
</tr>
<tr>
<td>30,779</td>
<td>24,439</td>
</tr>
</tbody>
</table>

(CO2e includes 5.512 tpy of CO2e for fugitive methane emissions)
Figure 11: Local SEQR Environmental Evaluation Form D2(k) for Horseheads and Brookman Corners

**HORSEHEADS**

<table>
<thead>
<tr>
<th>k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy?</th>
<th>☑ Yes ☐ No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Yes:</td>
<td></td>
</tr>
<tr>
<td>i. Estimate annual electricity demand during operation of the proposed action:</td>
<td></td>
</tr>
<tr>
<td>Natural gas from the existing pipeline will be used to operate the new station. The maximum annual energy consumption is estimated at 1147 MW-h.</td>
<td></td>
</tr>
<tr>
<td>ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other):</td>
<td></td>
</tr>
<tr>
<td>On-site combustion using micro-turbines. Electricity for normal operation of the facility will be generated on-site using natural gas powered microturbines. Back-up electricity will be provided by the local utility. It is anticipated that less than 1000kW-h of energy will be required annually from the local utility.</td>
<td></td>
</tr>
<tr>
<td>iii. Will the proposed action require a new, or an upgrade to, an existing substation?</td>
<td>☑ Yes ☐ No</td>
</tr>
</tbody>
</table>

**BROOKMAN CORNERS**

<table>
<thead>
<tr>
<th>k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy?</th>
<th>☑ Yes ☐ No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Yes:</td>
<td></td>
</tr>
<tr>
<td>i. Estimate annual electricity demand during operation of the proposed action:</td>
<td></td>
</tr>
<tr>
<td>Natural gas from the existing pipeline will be used to operate the new station. The estimated annual electricity demand is ~4,678 MW-h (per year).</td>
<td></td>
</tr>
<tr>
<td>ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other):</td>
<td></td>
</tr>
<tr>
<td>On-site combustion using micro-turbines. Electricity for normal operation of the facility will be generated on-site using natural gas powered microturbines. Back-up electricity will be provided by the local utility. It is anticipated that less than 1000kW-h of energy will be required annually from the local utility.</td>
<td></td>
</tr>
<tr>
<td>iii. Will the proposed action require a new, or an upgrade to, an existing substation?</td>
<td>☑ Yes ☐ No</td>
</tr>
</tbody>
</table>
VIII. Permits Can Not Be Issued Without Significant Mitigation

To be clear, the organizations submitting these comments maintain that Dominion's "New Market Project" must not proceed. As proposed, the project would harm air quality, threaten public health and exacerbate climate change. Further the three applications for Air State Facility permits must be rejected by the Department because they are incomplete, contain substantial errors and omissions, and are not supported by adequate models. Although we oppose the project, if the Department nevertheless intends to issue permits, significant mitigation must be imposed to reduce harm, including but not limited to the following.

A. The Department Must Require the Use of Best State-of-the-Art Technology

The draft permits prepared by the Department fail to require sufficient control technology necessary to protect surrounding communities and limit greenhouse gas emissions. Due to the propensity of incomplete, inaccurate, and misleading information from the applicant, the Department has a sound basis for requiring control technology that are more protective. At a minimum, the following improvements must be incorporated as additional or revised conditions if permits are granted.

As to all three applications, improved technology must be incorporated to reduce emissions, including measures that have not been implemented or proposed by Dominion, but that are identified by the EPA in its series of Natural Gas Star publications. For example, one of the EPA's publications titled "Reducing Emissions When Taking Compressors Off-Line" describe several practical changes in operating practices and the design of blowdown systems. Another titled "Install Automated Air/Fuel Ratio [AFR] Controls" describes the installation of control systems to automatically adjust and optimize air/fuel mixtures to improve engine operation, reduce emissions, and save fuel. A thorough evaluation of additional control technologies and operating practices should be undertaken at each site with the goal of reducing overall emissions and risks to public

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68 EPA Natural Gas Star program: [https://www.epa.gov/natural-gas-star-program/recommended-technologies-reduce-methane-emissions](https://www.epa.gov/natural-gas-star-program/recommended-technologies-reduce-methane-emissions)
Beyond the confines of the three compressor station sites, additional measures should also be taken. As discussed in comments submitted to FERC, letters to the NYS Public Service Commission\textsuperscript{69}, and a letter to the NYS Comptroller signed by 94 organizations from across the New York\textsuperscript{70}, tremendous concern exists regarding the safety of Dominion's 50-year-old pipeline, especially when it carries more gas. In addition to the potential for catastrophic rupture, more flow will increase the potential for greater system-wide leakage at Dominion's other facilities and along the pipeline corridor. We believe it is imperative for the PSC, with oversight by the State Comptroller, to investigate these concerns. Otsego 2000 also recommended in prior comments that isolation/shut-off valves be installed at additional locations to reduce the volume of gas released during pipeline blowdowns, including emergency blowdowns and other incidents. Equipped with remote shut-off capability, this could reduce the volume of releases and improve safety.

In addition to the above, the following specific deficiencies must be addressed.

1. **Timely Installation Of Oxidation Catalysts At Each Site**

   An oxidation catalyst is an emission control typically installed in the exhaust stream of a compressor station turbine or engine to reduce carbon monoxide, volatile organic compounds, and sulfur dioxide. It is now standard equipment, much like a catalytic converter on an automobile. Dominion plans to install oxidation catalysts on each of the new compressors in its project and has also said that it will install an oxidation catalyst on the Taurus 60 turbine that presently exists at Brookman Corners. However, instead of requiring that Dominion upgrade the existing turbine with this feature simultaneous with other construction, the Department has written in its draft permit that Dominion can wait up to two years before doing so. Specifically, item 40.2 of Condition 40 (second paragraph) states:

\textsuperscript{69} Urgent Request to Investigate Pipeline for Dominion "New Market Project", August 15, 2016; and Pipeline Safety Regarding Proposed Increased Capacity of the Dominion “New Market Project” (CP14-497-000), April 6, 2016

Both letters addressed to PSC Chair Audrey Zibelman from Otsego 2000, Mohawk Valley Keeper, and Madison County Neighbors for Environmental Preservation

https://drive.google.com/open?id=0B4L50jZxbRLBNlZWRmp2bGtUTVU

\textsuperscript{70} Pipeline Safety and Dominion New Market Project, May 9, 2016

Letter addressed to NYS Comptroller Thomas P. DiNapoli from 94 organizations

https://drive.google.com/open?id=0B4L50jZxbLBVEVAtUpidHpWNUE
The oxidation catalyst referenced above must be installed no later than 18 months from the date Emission Unit U-00003 is placed into service or October 31st, 2018, whichever is earlier. [Emission Unit U-00003 refers to the two reciprocating engines.]

Notably, on February 2, 2016, Dominion submitted a supplement to its original application, which revised downward the level of certain pollutants projected for Brookman Corners (formaldehyde, CO, VOCs, and total HAPs), assuming that an oxidation catalyst will be added. (See Table 2 of Appendix 1 in Dominion's February 2nd supplement.) However, if the permit from DEC does not actually require that the oxidation catalyst be installed before the expanded facility becomes operational, those revised projections are invalid and cannot be used in the Department's review.

The consequence of delay is that the community surrounding Brookman Corners could be exposed for 18 months to pollutant levels that are much higher than provided for in Dominion's revised application, in fact equivalent to its original application. There is no legitimate reason for this. Dominion has suggested that postponing installation of an oxidation catalyst on the Taurus 60 would allow the facility to continue operating while other construction takes place. However the existing turbine presently only operates about one day a week, which ought to provide sufficient time to install the catalyst with minimum impact to normal operations.

If a delay is permitted, the permit should be amended to require that once constructed, only the Centaur 50L (Emission Unit U-0002) be allowed to operate until an oxidation catalyst is installed on the Taurus 60. This would provide for construction of other compressor units at the site while the Taurus 60 continues to operate, and then allow the new Centaur 50L to function in place of the Taurus 60 while the Taurus 60 is upgraded with an oxidation catalyst. This would also ensure that all four compressor units at the site do not operate simultaneously until the Taurus 60 upgrade occurs. An advantage of this is that it would provide for in-line compression of gas to Schenectady as necessary without interruption, while also encouraging prompt installation of an oxidation catalyst on the Taurus 60 as soon as the Centaur 50L is operational.

To accomplish this, the following additional text should be inserted in place of the text to Item 40.2 of Condition 40 (second paragraph):
The oxidation catalyst referenced above must be installed before Emission Unit U-00003 is placed into service or October 31st, 2018, whichever is earlier. Once Emission Unit U-0002 is placed into service, the existing Solar Taurus 60 combustion turbine shall not operate until the oxidation catalyst referenced above is installed.

2. **Installation Of SoLoNOx On All Compressor Turbines**

   The Department has taken an inconsistent approach in the three draft permits relating to emission controls for NOx reduction.

   In each of its permit applications, Dominion said it would incorporate "SoloNox"\(^{71}\) (a Caterpillar emission control for turbines) on new equipment. (Exhibit I.) This includes the Taurus 70 turbine at Horseheads, the Taurus 70 turbine at Sheds, and the Centaur 50L turbine at Brookman Corners. Consistent with this, in the draft permits for Horseheads and Sheds, the SoLoNOx emission control is clearly identified, both pertaining to applicable federal requirement 6 NYCRR 200.6. For example, in the draft permit for Horseheads, Item 5.2 of Condition 5 states:

   > The combustion turbine shall be equipped with the SoLoNOx lean-mix dry low NOx combustion system and shall only operate in lean pre-mix mode (i.e. above 50% turbine load) except for startup, shutdown, below 0 degrees F ambient temperature and unavoidable malfunction periods.

   In the draft permit for Sheds, Item 6.2 of Condition 6 contains nearly identical wording.

   However in the draft permit for Brookman Corners, SoloNOx is not mentioned as an emission control on the new Centaur turbine that Dominion plans to install. This conflicts with Dominion's application and would allow for the use of inferior equipment that has not been

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\(^{71}\) SoLoNOx - Dry Low Emissions Technology  
[http://s7d2.scene7.com/is/content/Caterpillar/C10547639](http://s7d2.scene7.com/is/content/Caterpillar/C10547639)
considered in the applicant's modeling. Without the SoLoNOx emission control, levels of NOx from the turbine could be twice as high as projected.

The draft permit for Brookman Corners should be revised to clearly identify the use of SoLoNOx on the Centaur 50L turbine with wording comparable to the permits for Horseheads and Sheds, and it should reference the correct applicable federal requirement. (See above.) We cannot assume that Dominion will adhere to its proposed use of SoloNOx otherwise.

In addition to this, the Department should require that the existing Taurus 60 turbine at Brookman Corners be upgraded with the SoloNOx emissions control. To date, Dominion has not committed to doing this. Without SoLoNOx, the Taurus 60 turbine at Brookman Corners would actually produce higher levels of NOx than the larger Taurus 70 turbines planned for Horseheads and Sheds. (Comparing the three applications, the Taurus 60 without SoLoNox would produce 27.9 tons/year of NOx, whereas the Taurus 70 at Horseheads and Sheds would produce 22.3 tons/year and 22.1 tons/year respectively.) We estimate that requiring SoLoNOx on the Taurus 60 turbine at Brookman Corners would reduce NOx levels by 11.2 tons annually (a 40% reduction from this one turbine), and it would reduce total NOx emissions projected at the site from 66.3 tons/year to 55.1 tons/year.

SoLoNOx has been available as a customer option since 1992 and is a standard feature on turbines manufactured by Caterpillar today. Like the oxidation catalyst described above, including SoLoNOx on Dominion’s existing Taurus 60 would therefore be appropriate and consistent with the company's claims regarding the use of best available technology. Recognizing that the community surrounding Brookman Corners will be exposed to NOx levels that are much higher than Dominion’s other two compressor stations (even with this improvement), requiring SoLoNOx is a reasonable expectation. As previously discussed, the adverse human health impacts of exposure to NOx and ground-level ozone or acid rain produced by the interaction of NOx with VOCs and other compounds are well documented. These include respiratory problems (especially in children), lung and heart disease, and premature death. Adverse environmental impacts include damage to vegetation, reduced crop yield, and harm to water quality and aquatic species.\textsuperscript{72} Today, crop yield in the area of

\footnotesize{\textsuperscript{72} See https://www.epa.gov/ozonepollution/health-effects-ozone-pollution
http://www.ars.usda.gov/Main/docs.htm?docid=12462}
Brookman Corners is extremely productive, with some farmers reporting up to four cuttings of hay in a season. Therefore in addition to protecting human health, safeguarding the economic vitality of agriculture in Montgomery County is a solid reason for requiring SoLoNOx.

In addition to this, for the two reciprocating engine compressors, Item 39.3 of Condition 39 contains only a vague reference to "low NOx combustion technology," without any information as to what this entails. We request that additional NOx control specifications be included in the permit for these reciprocating units too.

3. **Installation Of Vapor Recovery On All Reciprocating Engines**

Fugitive emissions are a particular concern at Brookman Corners because of reciprocating engine compressors that Dominion proposes to use for transferring gas to the Iroquois pipeline. As discussed above, reciprocating engines represent older piston and cylinder technology, which causes them to leak far more than dry-seal turbines. Even if periodic maintenance and rod-packing replacement takes place, methane and VOCs are vented from reciprocating engines as part of normal operation. Moreover, the amount of that leakage will increase over time as rod packing seals degrade between maintenance events. Relying on a self-reporting system of compliance for rod packing replacement is also essentially unenforceable. Vapor recovery, on the other hand ensures that no unburned emissions are released into the atmosphere at all, regardless of rod-packing performance.

Several techniques are available to capture fugitive emissions, for example using a Vapor Recovery Unit (VRU) that injects captured gas back into the pipeline under pressure or a small onsite combustion system to collect and burn off vapors. In prior comments to DEC and FERC, Otsego 2000 recommended an innovative cost-effective system for capturing and destroying fugitive emissions developed by REM Technology\(^1\), a division of Spartan Controls.

The REM Technology *Slipstream* system is a vapor recovery process that manifolds rod packing emissions together and reroutes them under controlled conditions back to the air intake of the reciprocating engine where they are combusted. Emissions normally vented from other places in

\(^1\) REM Technology website: [www.remtechnology.com](http://www.remtechnology.com)

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a compressor station may be recaptured as well. REM Technology reports that its vapor recovery system results in the elimination of over 99% of VOC and methane emissions that would otherwise be released to the atmosphere. Moreover, since recaptured emissions are combusted, those hydrocarbons become part of the fuel stream, allowing the compressor station to operate more efficiently. This fuel-saving aspect of SlipStream allows the technology (which costs only about $15,000) to pay for itself within a short amount of time. Another benefit of Slipstream is that it provides for continual monitoring of rod-packing emissions, which improves maintenance and allows for the immediate detection of problems.\(^74\)

*Slipstream* has been installed at over 100 compressor stations across North America, and is recognized by both industry and government as an effective means of curbing emissions. Last year Targa Resources received an environmental excellence award for its use of *Slipstream* since 2011. Encana has also installed *Slipstream* at numerous sites in Canada with support of the Climate Change and Emissions Management Corporation (CCEMC). The technology is definitely "proven," and has been shown to operate effectively on "lean-burn" engines, including the Caterpillar G3608.\(^75\)

A significant amount of information about the REM Technology *Slipstream* system has already been provided to Chris Hogan (Division of Environmental Permits), Deputy Commissioner Jarad Snyder, and other staff within DEC. This includes a presentation given to the Department on March 23, 2016 by a technical specialist with Spartan Control. (Exhibit J). It also includes a memo

\(^{74}\) for example a damaged cylinder that would otherwise cause significant leakage over a prolonged period

\(^{75}\) According to Cam Dowler, technical specialist for Spartan Controls, [Dowler.Cam@spartancontrols.com](mailto:Dowler.Cam@spartancontrols.com) (403-695-2318), *Slipstream* is in use on a CAT3608 engine and five CAT 3606 engines at compressor stations operated by Targa Resources in Texas. (The CAT 3608 is located at Targa's New Harp Facility.) This is in addition to Slipstream being used at compressor stations operated by Encana (25 sites with Caterpillar engines), Conoco-Phillips, and others. It should be noted that Dominion states in its applications to FERC and DEC that it intends to route unburned gas released during turbine startup to the two CAT 3608 reciprocating engines. Using *Slipstream*, the reciprocating engines should therefore be able to accept unburned gas from rod-packing too.
from Otsego 2000 containing a description of *Slipstream* and several links to additional information. (Exhibit K) We incorporate these and other submissions provided to the Department by reference.76

Instead of requiring the vapor recovery of rod-packing emissions, the draft permit prepared by the Department merely requires compliance with federal OOOOa regulations, otherwise known as "Quad O" regulations. Item 24.2 of Condition 24 in the draft permit states:

The owner or operator of a reciprocating compressor must replace the reciprocating compressor rod packing according to either paragraph (1) or (2) below.

(1) On or before the compressor has operated for 26,000 hours. The number of hours of operation must be continuously monitored beginning upon initial startup of your reciprocating compressor affected facility, or the date of the most recent reciprocating compressor rod packing replacement, whichever is later.

(2) Prior to 36 months from the date of the most recent rod packing replacement, or 36 months from the date of startup for a new reciprocating compressor for which the rod packing has not yet been replaced.

As an alternative to the requirements of paragraph (1) and (2) above, the facility owner or operator may choose to collect the methane and VOC emissions from the rod packing using a rod packing emissions collection system that operates under negative pressure and route the rod packing emissions to a process through a closed vent system that meets the requirements of 40 CFR 60.5411a(a) and (d).

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See also the February 2, 2016 memo by Keith Schue, technical advisor for Otsego 2000, titled "Vapor Recovery for Reciprocating Compressor Engines at Brookman Corners Compressor Station" which describes the *Slipstream* system and includes several links to additional information: [https://drive.google.com/open?id=0B4L50jZxbrLBU1o0cGJKNiJhTEE](https://drive.google.com/open?id=0B4L50jZxbrLBU1o0cGJKNiJhTEE)

A demonstration of the *Slipstream* programmable controller and human interface can also be viewed here: [https://youtu.be/MWFipcfO3BA](https://youtu.be/MWFipcfO3BA)
As seen above, an option for installing a closed vent system like Slipstream for vapor recovery is provided as an alternative to rod packing replacement, but it is not required. Paragraphs (1) and (2) allow Dominion to avoid vapor recovery provided that rod packing is replaced every 26,000 hours or 36 months. We do not object to a regular schedule for rod packing replacement. However regardless whether this occurs, fugitive emissions from the rod packing of Dominion's reciprocating engines should not be permitted to simply escape into the atmosphere.

Due to public health concerns resulting from the unique topographic, meteorological, and community conditions at Brookman Corners, and in order to limit greenhouse gas emissions consistent with New York's aggressive climate goals, the DEC should require vapor recovery of rod-packing emissions if reciprocating engines compressors are installed (either the REM Tech Slipstream system or another of comparable performance). This can be accomplished by replacing the last part of Item 24.2 with the following:

**In addition** to the requirements of paragraph (1) and (2) above, the facility owner or operator **shall** collect the methane and VOC emissions from the rod packing using a rod packing emissions collection system that operates under negative pressure and route the rod packing emissions to a process through a closed vent system that meets the requirements of 40 CFR 60.5411a(a) and (d). *(emphasis added)*

If vapor recovery is implemented in lieu of rod-packing replacement, an annual inspection of rod-packing should still be required. Conditions 25 and 28 should be revised consistent with this as well.

Finally, we notice that in Condition 35, the Department includes an unusual requirement for Dominion to evaluate the "technical and economic feasibility" of installing vapor recovery in the future. While this seems to show some interest in the technology by the Department, it does not solve the problem with this permit application. Condition 35 simply calls on Dominion to consider the feasibility of vapor recovery two or three years after the compressor station is already running without it. The Department also claims this condition to be applicable to 6 NYCRR 201-5.3(c), but this is not possible since the condition does not actually require Dominion to install anything, now or in the future. The bottom line is that DEC has sufficient information and authority today to require that Dominion capture fugitive emissions from the rod-packing of its reciprocating engines, and should do so.
4. **Installation Of Electric-Drive Compressors**

In prior comments to FERC and DEC, Otsego 2000 suggested using electric-drive, instead of gas-fired, compressors. This would effectively eliminate combustion emissions associated with any gas-fired turbine or reciprocating engine that is replaced. Replacing reciprocating engines with electric motors would also substantially reduce fugitive emissions.

Dominion has offered various reasons for not doing this, but none pass muster. For example, it has been said that adequate power is not available for electric compressors. However at Brookman Corners, 230 KV high-voltage transmissions lines (soon to be upgraded to 345 KV) share an easement corridor with Dominion's pipeline and pass directly over the property. There is also ample room for a small substation on or near the site. Likewise, the feasibility of upgrading electric lines at Horseheads and Sheds has not been sufficiently explored.

It has also been suggested that an interruption in electricity could create an unacceptable loss of gas delivery. However gas would still flow in Dominion's main line if compression is temporarily interrupted; and although a loss of electricity could prevent the transfer of gas to the Iroquois, the primary flow of gas within the Iroquois pipeline would not be affected. The truth is that electric-drive compressors are as reliable as gas-fired and in fact are used at many compressor stations today. If there are unique problems with Dominion's pipeline network that prevent it from achieving what others have, the company has not identified what they are.

Finally, it has been suggested that electric compressors may not improve regional air quality or reduce greenhouse gas emissions since the additional electricity that they require could cause more gas to be burned at a power plant. However this ignores the fact that much of New York’s electricity today (57%) comes from low-carbon sources that do not involve combustion, including hydropower, nuclear power, and wind. Accounting for this, electric-drive compressors are likely to have the lowest carbon footprint.

Significantly, the EPA has published a Natural Gas STAR Fact Sheet No. 103 titled “Install Electric Compressors” which discusses the merits of electric compressors. As an example, it also describes an application in which an operator replaced five reciprocating compressors (two 2650 horsepower, two 4684 horsepower, and one 893 horsepower compressor) with four 1750 horsepower compressors.

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77 Otsego 2000 refutes this argument in detail in its request for rehearing of FERC's final order, herein incorporated by reference.
electric-drive compressors for an estimated annual fuel savings of 1,700,000 Mcf of natural gas.\textsuperscript{78} This is quite similar to the situation at Brookman Corners where two 2370 horsepower, Caterpillar G3608 reciprocating engine compressors are currently planned. We believe it is appropriate for electric compressors to be considered at Brookman Corners and Dominion's other sites.

\textbf{B. The Department Must Require Continuous Emissions Monitoring, Implement Fenceline Monitoring, And Perform Comprehensive Health Studies}

Real-world monitoring of air quality and public health is necessary to ensure that the public is protected, especially amid dubious emission projections and modeling supplied by the applicant. The Department should require: (1) continuous stack monitoring; (2) fenceline and community monitoring; and (3) a real-world health study.\textsuperscript{79}

Stack monitoring systems will verify whether or not a facility is compliant with applicable NAAQS. Moreover, \textit{continuous} stack monitoring is a significant improvement over stack tests that typically average emissions over time and are unable to detect spikes in air pollution or episodic emission events. Although they usually go unreported today, such events can significantly impact public health. In fact emerging research confirms that exposure to spikes in air pollution and episodic emission events can cause health impacts immediately or in as little as one to two hours.\textsuperscript{80} Continuous monitoring data would give both the Department and Dominion the opportunity to correct practices that cause spikes in air pollution and threaten public health. Reporting emissions once every year or two is totally inadequate.

Due to the close proximity of Dominion's compressor station to residential areas, we believe the company should perform continuous stack monitoring for pollutants, including nitrogen oxides.

\textsuperscript{78} Natural Gas Star EPA Pollution Preventer PRO Fact Sheet No. 103 https://www.epa.gov/sites/production/files/2016-06/documents/installelectriccompressors.pdf

\textsuperscript{79} These comments on emissions monitoring are informed by comments submitted to DEC on February 27, 2015 by the Clean Air Council and Earthworks regarding the Algonguin Gas Transmission project (Permit ID 3-3928-00001/00027). https://www.earthworksaction.org/files/publications/CAC_Stony_Point_Comments.pdf

and sulfur oxides, and report data to the Department quarterly. The draft permits presently state that performance tests shall be performed annually or biannually and makes no mention of continuous monitoring systems, only intermittent emission testing. This is unacceptable.

Fenceline and community monitoring should also be required. Ideally, these activities would be managed by state or county Departments of Health and the Department of Environmental Conservation, funded by Dominion, and performed by independent third parties, such as research organizations or academic institutions. Monitoring should occur in locations that would yield accurate results and where populations are most at risk (e.g., nearby homes and communities downwind of the compressor stations). Monitoring should take place before construction to provide baseline data, and on a regular basis thereafter.

To ensure accurate data collection, at least three or four monitors should be placed in different locations downwind of the site, and also at the north, south, east, and west fencelines. Monitors should be placed to account for site layout, topography, meteorological conditions, and surrounding communities. Each monitor should be capable of measuring concentrations of pollutants including, but not limited, to speciated VOCs and HAPs, formaldehyde, xylene, ethane, isobutene, methane, propane, nitrogen oxides, carbon monoxides, and sulfur dioxide. In order to measure fluctuations in area exposure, a combination of continuous measurement of pollutants, a continuous screening based on local weather conditions, and potential canister measurements to detect individual components of chemical mixtures should be used. Continuous measurements that are averaged hourly provide better data resolution. Wind direction and weather conditions should be monitored too. We recommended installing a small meteorological station to assist in this.

We also urge the Department to perform an independent assessment of potential health impacts from the proposed facility in coordination with the state Department of Health. The assessment should use EPA methodologies designed to assess risk from individual facilities and provide a full analysis of the risk factors for hazardous air pollutants. This should be coupled with a commitment to ongoing pollutant monitoring and health surveys. As discussed above, FERC's "Human Health Risk Assessment" was based on models that do not adequately account for real-world conditions. There is no substitute for the collection of field data and performance of studies involving actual human participants.

\[81 \text{ Id.}\]
In the absence of action by state agencies or industry, non-profit organizations have stepped in to perform pollutant monitoring and health studies, include research currently underway and planning at the three compressor stations sites subject to these permits. A leader is those efforts has been the Southwest Pennsylvania Environmental Health Project (SWPA-EHP), a non-profit environmental health organization made up of a team of health practitioners and public health scientists created to assist residents whose health has been impacted by natural gas drilling and infrastructure. The SWPA-EHP air and health monitoring protocol is referenced here.82

We strongly encourage the Department of Environmental Conservation and Department of Health to support, collaborate with, and expand upon this research, which is clearly consistent with and necessary to fulfilling their obligation of protecting the public. It is not sufficient to simply rely on the good-will of non-profit and volunteer organization to perform these critical functions.

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82 See [http://www.environmentalhealthproject.org/](http://www.environmentalhealthproject.org/)

83 SWPA-EHP Protocols for comprehensive monitoring and community assessment, March 15, 2016 [https://drive.google.com/open?id=0B4L50jZxbzrbLBZkhDNEJ2RG1fSHe](https://drive.google.com/open?id=0B4L50jZxbzrbLBZkhDNEJ2RG1fSHe)
Conclusion

For all the reasons stated above, Otsego 2000, Mohawk Valley Keeper, Madison County Neighbors for Environmental Preservation, and Mothers Out Front urge the Department to deny the air permits for Dominion's New Market Project.

Respectfully submitted,

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President, Board of Directors
Otsego 2000

Neely Kelley
New York State Lead Organizer
Mothers Out Front

John Valentine
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Co-Chair
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CC:
The Honorable Andrew M. Cuomo, Governor of New York State
Bassil Seggos, NYS DEC Commission
Jarad Snyder, NYS DEC Deputy Commission
Eric T Schneiderman: NYS Attorney General
Eric T. Scheiderman, NYS Attorney General
Thomas P. DiNapoli, NYS Comptroller

Submitted for the public record to: NewMarketProject@dec.ny.gov
EXHIBITS

A. Madison County DOH, *Comments to the FERC Concerning Docket No. CP14-497-000, Dominion Transmission, Inc.*, October 15, 2014. (prepared by Thimble Creek Research)
http://www.madisoncounty.ny.gov/sites/default/files/publicinformation/madison_county_doh_comments_-_docket_no._cp14-497-000.pdf

B. Otsego 2000 Comments on FERC EA for Dominion New Market Project, November 18, 2015.

Corrections: The Otsego 2000's prediction of NOx reduction in the table on page 7 assumes improvements that could only occur if the Taurus 60 turbine at Brookman Corners is also equipped with SoLoNOx. Also note that the additional Centaur 50L turbine in the table on page 9 should be identified as 6393 horsepower, not 11,000 horsepower.

C. Southwest Pennsylvania Environmental Health Project (SWPA-EHP) comments on FERC EA for Dominion New Market Project, November 19, 2015.

http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14266220

E. Written comments by Geoff Marshall, retired Navy test pilot
https://drive.google.com/open?id=0B4L50jZxbrLBNU42bFY1SIh4eTA

https://drive.google.com/open?id=0B4L50jZxbrLBMTJkakFtUEtkSmc ; see also referenced document "Our Valley"
https://drive.google.com/open?id=0B4L50jZxbrLBUzFvWUc0MEpHVk0

G. Scalia-Nellis Report and Photographs from Minden, NY and Rome, NY
https://drive.google.com/open?id=0B4L50jZxbrLBOEVkcmgxSlptNlU

https://drive.google.com/open?id=0B4L50jZxbrLBTo0cGJKN1hTGF

I. SoLoNOx - Dry Low Emissions Technology
http://s7d2.scene7.com/is/content/Caterpillar/C10547639

J. Technical presentation on March 23, 2016 by Spartan Controls on REM Technology *Slipstream* system "Vent Capture Solutions for the Oil and Gas Industry -- Methane, VOC and BTEX Destruction",

K. Technical memo dated February 2, 2016 from Otsego 2000 on *Slipstream* system
"Vapor Recovery for Reciprocating Compressor Engines at Brookman Corners Compressor Station"
https://drive.google.com/open?id=0B4L50jZxbrLBU1o0cGJKN1hTGF
Madison County, New York

Department of Health

Comments to the Federal Energy Regulatory Committee

Concerning Docket No. CP14-497-000, Dominion Transmission, Inc.

Submitted by

Madison County Department of Health
Madison County, New York

October 15, 2014
Executive Summary

The following comments are addressed to the Federal Energy Regulatory Commission in response to the permit application (Docket No. CP14-497-000) filed June 2, 2014, by Dominion Transmission, Inc. of Richmond, Virginia. The Madison County Department of Health has concerns that impacts to public health have not been adequately addressed in this permit, specifically in regard to the Sheds compressor station in Madison County. The National Environmental Policy Act requires that FERC take into account potential environmental impacts and that FERC address public concerns in its permit review. The Madison County Department of Health’s concerns are based in part on the report from the United States Environmental Protection Agency (USEPA) Inspector General that documents a lack of emissions data from oil and gas facilities which, in turn, casts doubt on the accuracy of projected air quality impacts. This brings into question the appropriateness of using the National Ambient Air Quality Standards to establish health safety risk near the Sheds compressor station. There are also documented correlations between health impacts and residential proximity to unconventional natural gas development facilities, including compressor stations.

Section II of these comments reviews what is known from the literature about compressor station emissions. Information specific to compressors is very limited. The types of chemicals that have been identified include VOCs, carbonyls and aldehydes, HAPs, aromatics and particulate matter. In particular, there is a lack of information on the intensity, frequency and duration of emission peaks that occur during blowdowns and large venting episodes that are a normal part of compressor operations. Blowdowns, on average, release 15 Mcf of gas into the atmosphere. Fugitive emissions and accidents are also of concern. One study from Fort Worth, Texas reported 2,126 fugitive emission points from a set of compressor stations. Radioactive chemicals are present in natural gas pipelines and can be released into the atmosphere, though little is yet known about exposure profiles for communities near compressor stations.

Section III reviews known health risks from known chemicals emitted, while acknowledging that there are data gaps in both chemicals emitted and potential health effects. Health risks from VOCs in the short term include eye and respiratory tract irritation, headaches, dizziness, visual disorders, fatigue, loss of coordination, allergic skin reaction, nausea, and memory impairment. Effects from long-term exposure include loss of coordination and damage to the liver, kidney, and central nervous system as well as elevated risk of cancer. Health effects from particulate matter affect both the respiratory and cardiovascular systems. Inhalation of PM2.5 can cause decreased lung function, aggravate asthma symptoms, cause nonfatal heart attacks and high blood pressure. Diesel emissions from truck traffic (primarily during construction of the compressor) can irritate the eyes, nose, throat and lungs, and can cause coughs, headaches, lightheadedness and nausea. Short-term exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. Long-term exposure can cause increased risk of lung cancer. Chemical exposure to vulnerable populations is a particular concern. The problem of chemical mixtures and how these might affect health needs further research.
Health effects associated with compressor stations are summarized in section IV. This set of research relies primarily on self-reported data from public health surveys. The symptoms identified are associated with health impacts on respiratory, neurological and cardiovascular body systems. These health effects correlate with the impacts associated with many of the chemicals emitted from compressor stations.

Madison County residents have reported numerous concerns to FERC and to the MCDOH (Section V). Primary concerns are for health safety and food/crop safety. Concerns about the safety record of compressors and pipelines, impact on community character and home values, emergency response preparedness, air quality and other environmental impacts were also raised.

Recommendations for framing and scoping public health issues (Section VI) includes information on relevant health data sources. Methods for assessing environmental health determinants include baseline data collection on air emissions, soil, and water quality.

Data gaps and other challenges to the implementation of a public health analysis are identified in section VII. These are: a lack of previous health studies that address compressor stations; limited data on chemical constituents of compressor air emissions including intensity, frequency and duration; the problem of poorly identified chemical mixtures and potential health effects; unidentified related emissions from metering stations and pipelines; the lack of data on potential radioactive chemical emissions; inadequate assessment of the effect of local weather patterns on dispersal of air pollutants (air dispersion modeling); and very limited information on the exposure pathway of air pollutants entering soil and food crops, and the potential for human health impacts.

Recommendations are also provided in the event that the permit is granted, as follows:

- Perform a baseline health study to establish population health status before the compressor station is built.
- Require best practices to ensure that effective emissions control measures are kept up to date.
- Establish an alert system for blowdowns or other large emissions and/or noise events.
- Put Emergency Plans in place.
- Institute a monitoring strategy at the Sheds compressor station and surrounding locations.
- Institute a health registry.
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I. Introduction

On June 2, 2014, Dominion Transmission, Inc. (DTI), of Richmond, Virginia filed an application with the Federal Energy Regulatory Commission (FERC), pursuant to Section 7(c) of the Natural Gas Act, to “construct, install, own, operate and maintain certain compression facilities that comprise the New Market Project located in Chemung, Herkimer, Madison, Montgomery, Schenectady, and Tompkins Counties, New York.” One new compressor station, known as the Sheds compressor station, would be located in Madison County. The Madison County Department of Health (MCDOH) submits the following comments to FERC in regard to public health concerns relating to the Sheds compressor station and associated infrastructure. These comments are submitted for the FERC Scoping Process which opened for comments on September 18, 2014. The National Environmental Policy Act (NEPA) requires that FERC take into account potential environmental impacts in its permit review. NEPA also requires FERC to discover and address public concerns, which in this case focus on risks to public health.¹

While the Madison County Department of Health understands that FERC has determined that the New Market Project (of which the Sheds compressor station is included) would follow an Environmental Assessment (EA) review process, instead of FERC’s more comprehensive Environmental Impact Statement process, there remain many unanswered questions pertaining to the impacts on public health from the installation and operation of the Sheds compressor station along with concerns that the application of the EA process may fail to consider such health impacts in its review of the Sheds compressor station.

A recent report from the United States Environmental Protection Agency (USEPA) Inspector General states that there is inadequate information available on direct measurement emissions from oil and gas production activities.² The report finds that incomplete datasets lead to underestimates of air quality impacts from these sources. The report further notes that “Limited data could affect decision-making impacting human health and the environment.” Health effects such as cancer risk, birth outcomes, skin rashes and respiratory problems have been correlated to production activities in peer-reviewed literature.³ These findings, in addition to our review of the current literature on compressor emissions and potential health impacts frames the MCDOH concern that there is an underestimation of risk by DTI.

Currently available literature suggests that emissions produced during the construction and operation of the proposed Sheds Compressor station will have
the potential to put nearby residents at risk for health effects (see sections II, III, IV below). The MCDOH believes that a more comprehensive public health analysis is needed because:

1. There is incomplete information on the content of compressor emissions
2. Important aspects of the air emissions are not explicitly addressed in the DTI application (DTI permit application Section 9) such as episodic periods of very high emissions, including but not limited to blowdowns, which can adversely affect human health
3. Standards by which estimated emissions are evaluated (DTI permit application p.9-11) for health risk were not intended to be health protective at an individual or neighborhood level
4. Madison County residents have documented concerns about health risks

Table 1 shows the types and distribution of land parcels surrounding the proposed compressor station within a three mile radius. Local residents and the MCDOH are concerned that health impacts may be experienced by individuals in the vicinity of the station (sections IV and V).

Table 1. Land parcel distribution within three miles of proposed Sheds compressor station*

<table>
<thead>
<tr>
<th>Parcel Category</th>
<th>1/2 Mile Radius</th>
<th>1 Mile Radius</th>
<th>3 Mile Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Land</td>
<td>5</td>
<td>9</td>
<td>60</td>
</tr>
<tr>
<td>Residential Year Round</td>
<td>17*</td>
<td>30</td>
<td>207</td>
</tr>
<tr>
<td>Seasonal</td>
<td>2</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Vacant Rural Residential Land</td>
<td>4</td>
<td>22</td>
<td>161</td>
</tr>
<tr>
<td>State/County Owned Forest</td>
<td>0</td>
<td>1</td>
<td>53</td>
</tr>
<tr>
<td>Private Forest</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Utility Land</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cemeteries</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0</td>
<td>0</td>
<td>4**</td>
</tr>
</tbody>
</table>

Notes:
* Closest Residential Structure Approx. 1,150 feet
** Reputed Amish School Approx. 6,700 feet

*Data courtesy of Madison County Real Property. Adapted by the Madison County Department of Health, Environmental Division. August 2014
The MCDOH recommends that if the more comprehensive EIS process is considered for this project it should take into account the following public health analysis component:

1. Data collection of baseline prevalence of relevant diseases including asthma, cancer, COPD, birth outcomes, as well as data on vulnerable populations in Madison County
2. Identification of impact pathways, susceptibility analysis, and cumulative impact factors
3. Consideration of local concerns in the assessment of health and environmental impacts

The remaining sections of these comments provide background information on four areas of public health concern for MCDOH (sections II – V), information on current data gaps (section VI), recommendations (section VII), and a summary of critical questions (section VIII):

**Section II** – Compressor station emissions - There are known emissions from compressor stations, as well as unidentified emissions. Frequency, intensity and duration of emissions at the proposed compressor station are not documented, yet these factors will determine the impact on nearby residents’ health.

**Section III** – Health risks from relevant air contaminants - The full array of possible health effects is not known, but there are known health effects from some of the chemicals emitted. A review of some known chemical effects on health is provided.

**Section IV** – Reported health effects specific to compressors - Some health effects have been documented in the vicinity of other compressor stations and associated pipelines and metering stations. A review of available research is provided.

**Section V** - Concerns of Madison County residents – A review of comments submitted to FERC ad MCDOH is provided.

**Section VI** - Recommendations for framing and scoping the public health issues for the Sheds compressor station.

**Section VII** – Data gaps and other challenges to the implementation of a public health analysis are identified.

**Section VIII** – Recommendations and mitigation (if permit granted) - MCDOH suggests several recommendations for mitigation specific to the Sheds compressor station.

**Section IX** - A summary of questions for FERC to address in assessing risks to public health.
II. Compressor station emissions

Compressor station emissions fall into two categories: construction emissions and operational emissions. Within operational emissions there are three types that warrant individual attention – blowdowns, fugitives and accidents. DTI provides a set of emissions projections for both the construction and overall operational phases of the Sheds compressor station (Resource Report 9 of DTI’s Application). This section of our comments reviews those projections and provides perspective on the aptness of the method of estimation (in tons per year) and need for further detail about the VOC and PM estimated emissions to better consider health risk. Discussion of the health risks produced by compressor station emissions will be presented in Sections III and IV.

Construction emissions

DTI reports the dust and other air contaminant emissions projections in its Abbreviated Application for a Certificate of Public Convenience and Necessity\(^4\). The Application states that of the six sites in the New Market Project, only three – the new compressor stations at Horseheads and Sheds, and adding combustion equipment to the existing Brookman Corners site – are large enough to require pre-construction permits. The other three are small and exempt from the Air State Facility Permit that the larger projects require.\(^5\)

*Fugitive Dust Emissions from Construction Activities*\(^6\)

Construction-related fugitive dust emission projections are required for the three larger facilities mentioned above. It is not clear whether the totals provided in the Application are for all six sites or just the three that require pre-permitting. The estimates are based on the extent and duration of active surface disturbance and are provided in tons per year (tpy).\(^7\)

<table>
<thead>
<tr>
<th>PM</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM 10</td>
<td>2.90</td>
<td>21.44</td>
</tr>
<tr>
<td>PM 2.5</td>
<td>0.29</td>
<td>2.14</td>
</tr>
</tbody>
</table>

Table 2. Fugitive Dust Emissions (tpy) for multiple New Market locations

These aggregated estimates tell us nothing specific about the construction phase of the Sheds compressor site. Because construction dust exposures at homes nearby would increase residents’ risks for respiratory and cardiac illness, we believe a set of estimates specific to Sheds is needed to adequately evaluate health risk.
Total construction emissions for Sheds project

Total emissions estimates for construction-related engines are provided specifically for the Sheds project. These construction emissions are, in part, the result of diesel powered vehicles and equipment.

Table 3. Sheds non-road and on-road construction engine emissions (tpy)\(^8\)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>2.12</td>
<td>3.45</td>
</tr>
<tr>
<td>NOx</td>
<td>3.76</td>
<td>4.70</td>
</tr>
<tr>
<td>SO2</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>VOC</td>
<td>0.37</td>
<td>0.60</td>
</tr>
<tr>
<td>PM10</td>
<td>0.27</td>
<td>0.39</td>
</tr>
<tr>
<td>PM2.5</td>
<td>0.27</td>
<td>0.38</td>
</tr>
<tr>
<td>CO2</td>
<td>959.44</td>
<td>1288.86</td>
</tr>
<tr>
<td>CH4</td>
<td>0.05</td>
<td>0.06</td>
</tr>
<tr>
<td>N2O</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>CO2e</td>
<td>966.80</td>
<td>1297.69</td>
</tr>
</tbody>
</table>

When thinking about exposures in the vicinity of the Sheds construction site, it is important to note the particulate matter (PM) numbers. Table 3 includes only the PM10 and PM2.5 emissions from construction engines. For a total estimate, those numbers would need to be added to the PM10 and PM2.5 dust emissions (Table 2). Additionally, the estimates in tons per year raise concerns that will be addressed in conjunction with the operational emissions below.

Operational emissions

DTI presents a summary of its estimated operational emissions for the Sheds Compressor Station.\(^9\) The Sheds combustion turbine will be fired exclusively with natural gas.\(^10\) The operational emissions estimates are:

- NOx: 24.4 tpy
- CO: 6.6 tpy
- PM10/PM2.5: 6.4 tpy
- VOCs: 2.9 tpy
- SO2: 0.7 tpy
- Formaldehyde: 0.1 tpy
- Other HAPs: 0.1 tpy
- Total HAPs: 0.3 tpy
**Perspective on emissions projected by DTI**

The Sheds construction and operational phases are projected to produce emissions below the NAAQS standards. They are presented in *tons per year*. This measure of emissions is used for NAAQS purposes which determine the air quality designation over a region and over long periods of time. The problem posed by estimating tons of contaminants emitted per year is that over the course of a year emissions will vary, often greatly. As phases of construction and operation change so will emissions content and concentrations. For a resident living near a compressor station, the concern is not simply PM2.5 emissions over the course of a year, but is PM2.5 emissions during the peak construction time when it’s at its most intense.

Even during normal operations compressor stations have been shown not to emit uniformly (“blowdown” and accident events will be discussed separately). The measurement *tons per year*, while common in the industry and common in the environmental field where regional air quality is at issue, is not an appropriate measure to determine individuals’ health risks which increase during episodes of high exposures.

Table 4 shows the day to day and morning to evening variability in emissions at one compressor station near Hickory, Pennsylvania. It comes from a Pennsylvania Department of Environmental Protection. We present this case to show documentation of fluctuations not captured by averages. Note how much relevant emissions information is lost when relying on averages, even of just three days. When extending this logic across a year, there is little doubt that there will be times of high levels of contaminants released and these high levels can increase health risks to residents. It is also notable that the EPA inhalation reference concentration (RfC) for ethylbenzene is 1 mg/m³ (equivalent to 1,000 ug/m³). Some of the reported emissions exceed this standard of health safety.

**Table 4. Variation in ambient air measurements of five VOCs near a compressor station reported in ug/m³**

<table>
<thead>
<tr>
<th>Chemical</th>
<th>May 18</th>
<th>Morning</th>
<th>Evening</th>
<th>May 19</th>
<th>Morning</th>
<th>Evening</th>
<th>May 20</th>
<th>Morning</th>
<th>Evening</th>
<th>3 day average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylbenzene</td>
<td>No detect</td>
<td>No detect</td>
<td>964</td>
<td>2015</td>
<td>10,553</td>
<td>27,088</td>
<td>6,770</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Butane</td>
<td>385</td>
<td>490</td>
<td>326</td>
<td>696</td>
<td>12,925</td>
<td>915</td>
<td>2,623</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n-Hexane</td>
<td>No detect</td>
<td>536</td>
<td>832</td>
<td>11,502</td>
<td>33,607</td>
<td>No detect</td>
<td>7,746</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The PA DEP collected data on many more chemicals than those listed above; the authors of this paper have chosen these chemicals specifically to highlight variation in emissions.*
Without knowing the characteristics of peak exposures expected from the Sheds project, an accurate estimate of health risk cannot be made. Discussion of those health risks is found in Sections IV and V of this report.

**Documented compressor emissions**

It is important to know, with more specificity, what chemicals will be emitted by the proposed Sheds facility so that a targeted assessment can be made about its potential health impacts.

There is a small but growing body of literature on emissions from shale gas extraction, processing and transport activities. In its early stages of inquiry, the focus was predominantly on drill pad activity, but there are now some reports on natural gas compressor station emissions. Below are examples of chemicals that have been found at or near compressor stations during operations. These emissions reports – whether from public databases or from a private sector firm or organization – do not provide relevant background levels of the chemicals detected. Without a “control” location it is not possible to say with certainty that the chemicals found are the result of the compressor station, although these facilities are often the only industrial activity in the areas where they are found.

Emissions from two compressor stations (Stewart and Energy Corps), published by the Pennsylvania Department of Environmental Protection (DEP)\(^\text{15}\) are:

- **MTBE**
- **CO**
- **iso-Butane**
- **methyl mercaptan**
- **n-Butane**
- **n-hexane**
- **n-octane**
- **nitrogen dioxide**
- **nitrous-acidstyrene**
- **2-methyl butane**
- **2 methyl pentane**
- **3 methyl pentane**
- **ethyl benzene**
- **benzene**
- **ethane**
- **propane**
- **methanol**
- **napthlelene**

The Texas Commission on Environmental Quality (TCEQ), as part of its Barnett Shale Formation Area Monitoring Projects found the following chemicals downwind from two monitored compressor stations\(^\text{16}\):

- **Downwind of Devon Energy Company LP’s Justin compressor station** the TCEQ reports propane, isobutene, n-butane, ethane, cyclohexane, benzene, n-octane, toluene, m+p-xylene, n-hexane.
- **Downwind of Targa North Texas LP’s Bryan Compressor Station** the TCEQ reports: ethane, propane, isobutene, n-butane, cyclohexane, n-octane, toluene, isopentane, n-pentane + isoprene, benzene.\(^\text{17}\)
Officials in DISH, TX commissioned a study of compressor station emissions in its vicinity. Wolf Eagle Consultants performed whole air emissions sampling for VOCs, HAPs as well as Tentatively Identified Compounds (TICs). Chemicals identified as exceeding Texas’s ESLs include:

- benzene
- dimethyl disulfide
- methyl ethyl disulphide
- ethyl-methylethyl disulfide
- trimethyl benzene
- diethyl benzene
- methyl-methylethyl benzene
- tetramethyl benzene
- naphthalene
- 1,2,4-trimethyl benzene
- m&p xylenes
- carbonyl sulfide
- carbon disulfide
- methyl pyridine
- dimethyl pyridine

In 2011 and 2013, Earthworks, a non-profit organization, collected air samples within 0.33 miles of two compressor stations: Springhill compressor in Fayette County and the Cumberland/Henderson compressor station in Greene County, Pennsylvania. Results from samples collected include:

- 1,1,2-Trichloro-1,2,2-trifluoroethane
- ethylbenzene
- methane
- 1,2-dichlorobenzene
- methylene chloride
- 2-butanone
- tetrachloroethylene
- benzene
- toluene
- carbon tetrachloride
- trichloroethylene
- chloromethane
- trichlorofluoromethane
- dichlorodifluoromethane

Anecdotally, we know that people living near compressor stations report episodic strong odors as well as visible plumes during venting or blowdowns. Residents often report symptoms that they associate with odors such as burning eyes and throat, skin irritation, and headaches. These are simply anecdotes but they are fairly consistently reported. It should be noted that residents in southwest Pennsylvania where these anecdotes were collected, often live near drill pads and in some instances processing plants along with compressor stations.

**Emissions pathways**

In addition to the emissions produced during the normal operations of a compressor station there are several other ways that emissions might be dispersed from the site. These include fugitive releases, blowdowns, and accidents. Trucks play a significant
role in the emissions profile during construction but are not common once the facility is complete and on line.

Fugitive emissions

Fugitive emissions are uncontrolled or under-controlled releases. They occur from equipment leaks and evaporative sources. DTI includes fugitive emissions in its estimate of VOC emissions. Other categories of fugitive pollutants such as PM likely would increase if they were included in emissions projections. It has been suggested that fugitive emissions will increase over time as machinery begins to wear.21

There does not appear to be a central publically available source of information of these emissions. There are, however, many opportunities for fugitive emissions to be released from a compressor station. We were able to locate only one study on natural gas compressor station fugitive emissions. In that study, conducted in the Fort Worth, TX area, researchers evaluated compressor station emissions from eight sites, focusing in part on fugitive emissions. A total of 2,126 fugitive emission points were identified in the four month field study of 8 compressor stations: 192 of the emission points were valves; 644 were connectors (including flanges, threaded unions, tees, plugs, caps and open-ended lines where the plug or cap was missing); and 1,290 were classified as Other Equipment. The Other category consists of all remaining components such as tank thief hatches, pneumatic valve controllers, instrumentation, regulators, gauges, and vents. 1,330 emission points were detected with an IR camera (i.e. high level emissions) and 796 emission points were detected by Method 21 screening (i.e. low level emissions). Pneumatic Valve Controllers were the most frequent emission sources encountered at well pads and compressor stations.22

Blowdowns

The largest single emission at a compressor station is the compressor blowdown.23 They can be scheduled or accidental. As the natural gas rushes through the blowdown valve, a gas plume extends upward of 30 to 60 meters. The most forceful rush of air occurs at the very beginning, then the flow gradually slows down. The first 30 to 60 minutes of the blowdown are the most intense, but the entire blowdown may last up to three hours.24 One blowdown vents 15 Mcf gas to atmosphere on average. Isolation valves leak about 1.4 Mcf/hr on average through open blowdown vents.25

It is not possible to know what exactly would be emitted in a given natural gas compressor station blowdown as there is no data available. We know that it will include whatever is in the pipeline when the blowdown occurs. This would undoubtedly include the constituents of natural gas: methane, ethane, etc., and various additional constituents would be present during different episodes. We are especially concerned about the presence of radioactive material during a blowdown
[see Radioactivity section]. Anecdotally, there are reports of odors and burning eyes, headaches and coughing associated with the events.26

In addition to uncertainty about what would be emitted and therefore what nearby residents would be exposed to, there is no special mention of how much is emitted under different circumstances in the DTI Application. There is attention paid to these episodic events in terms of noise disturbance, but not in terms of air contamination and subsequent exposure to individuals nearby. Because DTI does not address blowdown emissions separately, we cannot know at this point if blowdown emissions are included in the annual TPY emissions projections. This should be clarified. Whether they are or are not, their potency, when they are underway, is not known although the emission is extreme.

In Section III we show why averaging over a year such extreme emission events will underestimate the risks posed by them. An exposure to blowdown concentrations of contaminants would have different health implications than a long-term lower level exposure (i.e. yearly average) to the same contaminants when the compressor is on line.

**Accidents**

In addition to planned emissions, fugitive emissions and blowdowns there is also the possibility of accidents at the compressor station. There are no central national or state inventories of compressor station accidents that we were able to locate. In their absence we turned to local news accounts of individual accidents (which are generally in the form of fires). Without knowing what precisely is in the pipeline nor what else (if anything) may be housed on the site, it is not possible to estimate emissions from a fire at the compressor station. The possibility, however, is very real. A gas compressor station exploded near Godley, TX. That fire destroyed the compressor station where it started and also the one next to it. The fire burned for several hours.27 In a compressor station fire in Madison County, TX volunteer firefighters from four towns were dispatched to the site. First responders blocked roads near the site and evacuated three homes.28 In Corpus Christi, TX a fire broke out at a compressor station which then spread to nearby brush before being extinguished.29

The possibility of fire or other accidents raises the concern over whether the localities surrounding the proposed Sheds compressor station have the resources available to contain a fire or explosion adequately and whether first responders and hospitals are able to care for injured workers or others nearby or whether an evacuation plan could be implemented. In Wheeler County, TX four contractors were performing maintenance activities near a compressor station when a flash fire occurred. The workers were brought to a nearby hospital. Two were treated and released; the other two were transferred to a burn unit in Lubbock.30 In Carbon County, UT an explosion and fire damaged a natural gas compressor station and other buildings on the site.
injuring two workers and engulfing the facility in flame. Firefighters from every city in the county responded to the emergency. Injured workers had to be evacuated by medical helicopters.\textsuperscript{31}

This is of particular concern for Madison County where the ambulatory squads and first response units are operated with volunteers and it has become increasingly difficult for communities in Madison County to keep these emergency medical services fully staffed and trained in advanced medical techniques and response activities.

Overall, there is little information on the division of responsibility between the company operating the facility and the locality. This should be clarified if the Sheds compressor station moves forward.

**The question of radioactivity**

A 2008 publication of the International Association of Oil & Gas Producers has laid out the discussion on radioactive material in the natural gas extraction and production process.

During the production process, naturally occurring radioactive material (NORM) flows with the oil, gas and water mixture and accumulates in scale, sludge and scrapings. It can also form a thin film on the interior surfaces of gas processing equipment and vessels. The level of NORM accumulation can vary substantially from one facility to another depending on geological formation, operational and other factors.

[R]adionuclides such as Lead-210 and Polonium-210 can … be found in pipelines scrapings as well as sludge accumulating in tank bottoms, gas/oil separators, dehydration vessels, liquid natural gas (LNG) storage tanks and in waste pits as well as in crude oil pipeline scrapings.\textsuperscript{32}

The gas which flows through the pipeline likely carries gaseous radon with it, and as radon decays within the pipeline, the solid daughter elements, polonium and lead, accumulate along the interior of the pipes. There is a concern that the gas transiting, and being compressed and regulated, will have radioactivity levels which will put at risk not only the workers at these stations and along the pipeline, but potentially also to the residents.\textsuperscript{33} Radon, a gas, has a short half-life (3.8 days) but its progeny are lead and polonium, and these are toxic and have relatively long half-lives of 22.6 years and 138 days respectively.\textsuperscript{34} There is no data that we can turn to in order to assess the risk of radioactive exposures in our community.

**III. Health risks from relevant air contaminants**
Averages, peaks and health events

As stated in the Operational Emissions section, one of our primary concerns is the poor fit of a *tons per year* measurement to the assessment of risk to the public’s health near the proposed Sheds compressor station. Furthermore, the National Ambient Air Quality Standards (NAAQS) used by DTI as a benchmark for air quality were not created to assess the air quality and safety in a small geographic area with fluctuating emissions. NAAQS effectively address regional air quality concerns. But these standards do not adequately assess risk to human health for residents living in close proximity to polluting sources such as unconventional natural gas development (UNGD) sites, where emissions can be highly variable. Generally, it has been shown that:

1. Current protocols used for assessing compliance with ambient air standards do not adequately determine the intensity, frequency or durations of the actual human exposures to the mixtures of toxic materials released regularly at UNGD sites, including compressor stations.
2. The typically used periodic 24-hour average measures can underestimate actual exposures by an order of magnitude.
3. Reference standards are set in a form that inaccurately determines health risk because they do not fully consider the potential synergistic combinations of toxic air emissions.  

Thus estimates of yearly totals of contaminants released by the Sheds compressor station do not allow for an assessment of the physiological impact of those emissions on individuals.

About the construction emissions, DTI says:

Operations associated with Project facilities will not exceed any NAAQS.  At the Sheds Compressor Station, modeling results indicate that all resultant pollutant concentrations (baseline concentration plus impact of the new compressor station) would be less than approximately 55 percent of any NAAQS.  However, because of the relatively large margin between modeled concentrations and NAAQS limits, it is unlikely that any NAAQS would be exceeded from the cumulative impacts in the Project area.

NAAQS reflects what, over a region, over time, is deemed safe population-wide. This is very different than what is safe within for instance 1200 feet of this compressor station (which is how close the nearest residence is).  As already stated, averaging over a year can wash out important higher spikes in emissions (thus exposures) that may occur at various points throughout the year. These high spikes can put residents at risk for illnesses caused by air toxics.
Toxicity and characterization of exposures

Toxicity of a chemical to the human body is determined by the concentration of the agent at the receptor where it acts. This concentration is determined by the intensity and duration of the exposure. All other physiological sequelae follow from the interaction between agent and receptor. Once a receptor is activated, a health event might be produced immediately or in as little as one to two hours. In some instances, where there is a high concentration of an agent, a single significant exposure can cause injury or illness. This is the case in the instance of an air contaminant induced asthma event. On the other hand, after an initial exposure, future exposures might compound the impact of the first one, in time, producing a health effect. Repeated exposures will increase, for instance, the risk for ischemic heart disease.

Peak exposures

Researchers have demonstrated the wisdom of looking at peak exposures as compared to averages over longer periods of time. Darrow et al (2011) write that sometimes peak exposures better capture relevant biological processes. This is the case for health effects that are triggered by, short-term, high doses. They write, “Temporal metrics that reflect peak pollution levels (e.g., 1-hour maximum) may be the most biologically relevant if the health effect is triggered by a high, short-term dose rather than a steady dose throughout the day. Peak concentrations ... are frequently associated with episodic, local emission events, resulting in spatially heterogeneous concentrations.”

Delfino et al (2002) posited that maxima of hourly data, not 24-hour averages, better captured the risks to asthmatic children, stating, “it is expected that biologic responses may intensify with high peak excursions that overwhelm lung defense mechanisms.” Additionally, they suggest that “[o]ne-hour peaks may be more influenced by local point sources near the monitoring station that are not representative of regional exposures....”

Because episodic high exposures are not typically documented and analyzed by researchers and public agencies, natural gas compressor stations emissions are rarely correlated with health effects in nearby residents. However, examination of published air emission measurements shows the very real potential for harm from industry emissions. Reports of acute onset of respiratory, neurologic, dermal, vascular, abdominal, and gastrointestinal sequelae near natural gas facilities contrast with research that suggests there is limited risk posed by unconventional natural gas development.

Health Effects from exposures to VOCs
VOCs, present at compressor station construction and operation, are a varied group of compounds which can range from having no known health effects to being highly toxic. Short-term exposure can cause eye and respiratory tract irritation, headaches, dizziness, visual disorders, fatigue, loss of coordination, allergic skin reaction, nausea, and memory impairment. Long-term effects include loss of coordination and damage to the liver, kidney, and central nervous system. Some VOCs, such as benzene, formaldehyde, and styrene, are known or suspected carcinogens. The case for elevated risk of cancer from UNGD VOC exposure has been made by McKenzie et al (2012) and others.

The inhalation of the VOC, benzene, produces a number of risks including

[acute (short-term)] drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. EPA has classified benzene as known human carcinogen for all routes of exposure.

Benzene, which is documented at compressor stations by the States of Pennsylvania and Texas, carries its own risk, including risk for cancer. There is growing evidence that benzene is associated with childhood leukemia. Benzene affects the blood-forming system at low levels of occupational exposures, and there is no evidence of a threshold. It has been argued in the literature that “[t]here is probably no safe level of exposure to benzene, and all exposures constitute some risk in a linear, if not supralinear, and additive fashion.

Another substance that is detected near compressor stations is methylene chloride. According to the EPA

The acute (short-term) effects of methylene chloride inhalation in humans consist mainly of nervous system effects including decreased visual, auditory, and motor functions, but these effects are reversible once exposure ceases. The effects of chronic (long-term) exposure to methylene chloride suggest that the central nervous system (CNS) is a potential target in humans and animals. Human data are inconclusive regarding methylene chloride and cancer. Animal studies have shown increases in liver and lung cancer and benign mammary gland tumors following the inhalation of methylene chloride.
The VOC formaldehyde is also considered a Hazardous Air Pollutant (HAP) by the US EPA (EPA). It is one of the emissions chemicals that the natural gas development industry is required to report, for instance to the PA DEP. According to these reports, compressor stations are the highest UNGD source for formaldehyde. For the year 2012, emissions of formaldehyde from compressor stations in Pennsylvania ranged from 0.0 TPY to 22.5 TPY.

A recent study of air emissions in the Barnett shale region of Texas found concentrations of formaldehyde at sites with large compressor stations. Some of these concentrations were greater than the Texas Commission on Environmental Quality’s health protective levels (page 62). Formaldehyde was one of 101 chemicals found in association with methane in this study. The research showed that aromatics in particular were associated with compressor stations.

Air exposures to formaldehyde target the lungs and mucous membranes and in the short-term can cause asthma-like symptoms, coughing, wheezing, and shortness of breath. The EPA classifies it as a probable human carcinogen. The World Health Organization classifies it as carcinogenic to humans. It has also been associated with childhood asthma. The California Office of Environmental Health Hazard assessment (OEHHA) has “identified formaldehyde as a Toxic Air Contaminant and gives it an inhalation Reference Exposure Level (REL) of 55 ug/m$^3$ for acute exposures and 9 ug/m$^3$ for both 8-hour and chronic exposures.” The acute REL is 74 ppb based on irritation of asthmatics. It has also been linked with adverse pregnancy outcomes and reproductive and developmental toxicity.

More recent investigations on formaldehyde near compressor stations are focused on the chemical reaction between methane and sunlight. While it is well known that stationary compressor station engines emit formaldehyde, it is less well known that formaldehyde may also be formed at these sites through this chemical reaction. While the research is ongoing, it suggests that health hazards associated with formaldehyde may be greater than previously thought. Because reported health symptoms near compressor stations, such as respiratory impacts and shortness of breath, can be caused by exposure to formaldehyde, targeted monitoring of this chemical at these sites would be recommended.

**Effects from exposure to particulate matter**

In addition to the VOC exposure presented above, PM2.5 also poses a significant health concern and interacts with the airborne VOCs increasing their impact. In fact, at a compressor station PM2.5 may pose the greatest threat to the health of nearby residents. Fine particles are expected to reach a total of 1.136 tons for 2015 and 2016.

The size of particles determines the depth of inhalation into the lung; the smaller the particles are, the more readily they reach the deep lung. Particulate matter (PM10,
PM2.5 and ultrafine PM), in conjunction with other emissions, are at the core of concern over potential effects of UNGD.

High particulate concentrations are of grave concern because they absorb airborne chemicals in their midst. The more water soluble the chemical, the more likely it is to be absorbed onto a particle. Larger sized particles are trapped in the nose and moist upper respiratory tract thereby blocking or minimizing their absorption into the blood stream. The smaller PM2.5 however, is more readily brought into the deep lung with airborne chemicals and from there into the blood stream. As the particulates reach the deep lung alveoli the chemicals on their surface are released at higher concentrations than they would in the absence of particles. The combination of particles and chemicals serves, in effect, to increase in the dose of the chemical. The consequences are much greater than additivity would indicate; and the physiological response is intensified. Once in the body, the actions between particles and chemicals are synergistic, enhancing or altering the effects of chemicals in sometimes known and often unknown ways.

Reported clinical actions resulting from PM2.5 inhalation affect both the respiratory and cardiovascular systems. Inhalation of PM2.5 can cause decreased lung function, aggravate asthma symptoms, cause nonfatal heart attacks and high blood pressure. Research reviewing health effects from highway traffic, which, like UNGD, has especially high particulates, concludes, “[s]hort-term exposure to fine particulate pollution exacerbates existing pulmonary and cardiovascular disease and long-term repeated exposures increases the risk of cardiovascular disease and death.” PM2.5, it has been suggested, “appears to be a risk factor for cardiovascular disease via mechanisms that likely include pulmonary and systemic inflammation, accelerated atherosclerosis and altered cardiac autonomic function. Uptake of particles or particle constituents in the blood can affect the autonomic control of the heart and circulatory system.”

Ultrafine particles (<0.1) get less attention in the literature than PM2.5 but is found to have high toxic potency. These particles readily deposit in the airways and centriacinar region of the lung. Research suggests increases in ultrafine particles pose additional risk to asthmatic patients. Ultrafine particles are generally produced by combustion processes. They, along with the larger PM2.5, are found in diesel exhaust.

Diesel is prevalent during the construction phase of compressor station site. High levels of diesel exhaust from construction machinery as well as trucks increase the level of respirable particles. Health consequences of diesel exposure have been widely studied and include immediate and long term health effects. Diesel emissions can irritate the eyes, nose, throat and lungs, and can cause coughs, headaches, lightheadedness and nausea. Short-term exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and
increase the frequency or intensity of asthma attacks. Long-term exposure can cause increased risk of lung cancer.\textsuperscript{67}

**PM2.5 acute effects**

There is an abundance of research on the health effects of short term PM2.5 exposure. Mills et al demonstrate that one to two hours of a diesel exhaust exposure, which occurs during the construction phase of development, includes reduced brachial artery diameter and exacerbation of exercise-induced ST-segment depression in people with pre-existing coronary artery disease; ischemic and thrombotic effects in men with coronary heart disease;\textsuperscript{68} and is associated with acute endothelial response and vasoconstriction of a conductance artery.\textsuperscript{69} Fan He et al. suggest that health effects can occur within 6 hours of elevated PM2.5 exposures, the strongest effects occurring between 3 and 6 hours. Such an acute effect of PM2.5 may contribute to acute increase in the risk of cardiac disease, or trigger the onset of acute cardiac events, such as arrhythmia and sudden cardiac death.\textsuperscript{70}

Numerous epidemiological studies have demonstrated a consistent link between particulate matter and increased cardiopulmonary morbidity and mortality (Brook et al. 2004; Mann et al. 2002; Pope et al. 2002; Samet et al. 2009; Schwartz 1999).\textsuperscript{71} Previous studies have suggested that PM2.5 exposure is significantly associated with increased heart rate and decreased heart rate variability (HRV; Gold et al., 2000; He et al. 2010; Liao et al. 1999; Luttmann-Gibson et al. 2006; Magari et al. 2001; Park et al. 2005).

In addition to short term exposures and associated effects, there is evidence of health impacts from long-term exposures.\textsuperscript{72} An HIA reviewing data from a number of European cities found that nearly 17,000 premature deaths from all causes, including cardiopulmonary deaths and lung-cancer deaths, could be prevented annually if long-term exposure to PM2.5 levels were reduced. Equivalently, this reduction would increase life expectancy at age 30 by a range between one month and more than two years in the study cities. A Canadian national cohort study found positive and statistically significant associations between non-accidental mortality and estimates of PM2.5, the strongest association being with ischemic heart disease. Associations in this study were with concentrations of PM2.5 as low as only a few micrograms per cubic meter.\textsuperscript{73} Research has also shown that there is an association between PM2.5 and hospitalization for COPD in elderly people.\textsuperscript{74}

There is also a considerable literature on the health effects specifically from diesel emission that include PM2.5 along with chemical components. Mills et al conclude that even dilute diesel emissions can induce risk and point to ischemic and thrombotic
mechanisms for the adverse cardiovascular events associated with diesel exposure.\textsuperscript{75}

After an extensive review, The EPA concluded that long-term inhalation exposure is likely to pose a lung cancer risk to humans. Estimation of cancer potency from available epidemiology studies was not attempted.\textsuperscript{75} A noncancer chronic human health hazard is inferred from rodent studies showing dose-dependent inflammation and histopathology in rats. Short-term exposures were noted to cause irritation and inflammatory symptoms of a transient nature these being highly variable across an exposed population. The assessment also indicates that there is emerging evidence for the exacerbation of existing allergies and asthma symptoms.\textsuperscript{76}

**Children, pregnant women and air contaminants**

Children and pregnant women are especially sensitive to pollution. Many studies confirm a range of adverse effects of air pollution on children's lung function and respiratory symptoms, especially for asthmatics. Recent studies have found statistically significant associations between the prevalence of childhood asthma or wheezing and living very close to high volume vehicle roadways.\textsuperscript{77} Other research aimed specifically at children’s PM2.5 exposure has found that PM2.5 and several of its components have important effects on hospital admissions for respiratory disease, especially pneumonia. The authors count among the sources for this exposure diesel exhaust, motor vehicle emissions, and fuel combustion processes.\textsuperscript{78} While those living near the proposed Sheds compressor station are not on what would be consider typical high volume vehicle roadways, during the construction phase of the project residents along the access roads will be exposed to heavy emissions. And even once the construction phase is completed and compressor station is up and running there are similarities in what Dominion projects it will emit and those emissions from high volume vehicle traffic.

Health effects have been found in pregnant women from high particulate highway pollution. Such particle pollution “may provoke oxidative stress and inflammation, cause endocrine disruption, and impair oxygen transport across the placenta, all of which can potentially lead to or may be implicated in some low birth weight ... and preterm births.” The consequences do not stop with low birth weight and preterm births because these conditions can negatively affect health throughout childhood and into adulthood.\textsuperscript{79}

**Mixtures and sequential exposures**

Mixtures of pollutants are a critically important topic in addressing the public health implications of UNGD broadly and compressor stations in this case. While this report
has focused primarily on three pollutants (VOCs, formaldehyde as one example, and PM2.5), in fact, a very large number of chemicals are released together. Medical reference values are not able to take the complex nature of the shale environment, its multiple emissions and interactions into full consideration.\textsuperscript{80} Although the shale gas industry is not unique in emitting multiple pollutants simultaneously, this industry is unique in doing so as close as 500 feet from residences.

Chemicals that reach the body interfere with metabolism and the uptake and release of other chemicals, be they vitally important biochemical produced and needed by the body or other environmental chemicals with potentially toxic effects. Some chemicals attack the same or similar target sites creating an additive effect. This is the case with chemicals of similar structure such as many in the class of VOCs. Some mixtures like PM and VOC act synergistically to increase the toxicity of the chemicals. Other chemicals released environmentally are rapidly absorbed and slowly excreted. These slowly excreted chemicals will interfere with subsequent actions of chemicals because the body has not yet cleared the effects from the earlier exposure.

**Noise**

Excessive noise has been associated with an array of psychological and physical effects. A review article on noise exposure and health risk published in *Noise and Health* claims that the evidence for a causal relationship between community or transportation noise and cardiovascular risk has risen in recent years. In sum, the author finds limited evidence for a causal relationship between noise and biochemical effects; limited or sufficient evidence for hypertension; and sufficient evidence for ischemic heart disease.\textsuperscript{81}

According to a World Health Organization assessment of research, excessive noise can also increase risk of cognitive impairment in children, sleep disturbance, tinnitus, and high levels of annoyance.\textsuperscript{82} Researchers have found associations between elevated sound levels – including community sounds levels – and hearing loss, reduced performance and aggressive behavior.\textsuperscript{83} Additionally some attention is being paid to the health effects of vibration exposure which is connected with but distinct from noise itself.\textsuperscript{84}

Noise exposures are associated with construction activities and during blowdown episodes. Although noise estimates were provided by DTI, we believe the effects of these exposures as well as vibration exposures should be evaluated by outside experts in the field. As with air exposures, the periods of extreme exposures (in this case noise exposures) can cause different and sometimes more serious effects than low-level exposures.

**Summary**
In sum, we know that a number of different chemicals as well as PM2.5 are present during the construction phase of compressor stations and they are present in close proximity to compressor stations that are on line. Some, although not all, have documented health effects on vulnerable populations and on the population at large. What we do not know, in the case of the proposed Sheds compressor station, is the precise mix and concentration of chemicals that will be released into the air. Without that information it is not possible to assess the compressor station’s full impact on area residents. A thorough community health study could, however, reveal important risks specific to residents in Madison County, NY.

IV. Reported health effects specific to compressor stations

There is a growing body of research on emissions and health impacts from UNGD generally, though few studies specifically address health impacts from compressor stations. This is partly due to the fact that many compressors are sited in proximity to other UNGD sites such as well pads, impoundments, condensate tanks and processing stations. As the infrastructure for transporting natural gas continues to expand, more pipelines, metering stations and compressor stations will be sited away from other UNGD facilities.

Recent research that has been conducted near compressor stations in different parts of the country shows consistencies in the types of symptoms experienced by those living near these sites. These symptoms are associated with health impacts on respiratory, neurological and cardiovascular body systems. It should be noted that in each of the studies cited here health survey forms were filled out by residents and, as such, the findings are self-reported. To date there have been no epidemiological studies performed to identify health impacts from compressor stations.

A peer-reviewed article, Investigating Links Between Shale Gas Development And Health Impacts Through A Community Survey Project In Pennsylvania (2014) is one of the few publications that explicitly addresses health impacts from compressors. The report states:

In the Pennsylvania study, distance to industrial sites correlated with the prevalence of health symptoms. For example, when a gas well, compressor station, and/or impoundment pit were 1500-4000 feet away, 27 percent of participants reported throat irritation; this increased to 63 percent at 501-1500 feet and to 74 percent at less than 500 feet. At the farther distance, 37 percent reported sinus problems; this increased to 53 percent at the middle distance and 70 percent at the shortest distance. Severe headaches were reported by 30 percent of respondents at the farther distance, but by about 60 percent at the middle and short distances.
Age groups also responded differently in terms of health symptoms:

Among the youngest respondents (1.5-16 years of age), for example, those within 1500 feet experienced higher rates of throat irritation (57% vs. 69%) and severe headaches (52% vs. 69%). It is also notable that the youngest group had the highest occurrence of frequent nosebleeds (perhaps reflective of the more sensitive mucosal membranes in the young), as well as experiencing conditions not typically associated with children, such as severe headaches, joint and lumbar pain, and forgetfulness.

Among 20- to 40-year-olds, those living within 1500 feet of a facility reported higher rates of nearly all symptoms; for example, 44 percent complained of frequent nosebleeds, compared to 29 percent of the entire age group. The same pattern existed among 41- to 55-year-olds with regard to several symptoms (e.g., throat and nasal irritation and increased fatigue), although with smaller differences and greater variability than in the other age groups.

The subset of participants in the oldest group (56- to 79-year-olds) living within 1500 feet of facilities had much higher rates of several symptoms, including throat irritation (67% vs. 47%), sinus problems (72% vs. 56%), eye burning (83% vs. 56%), shortness of breath (78% vs. 64%), and skin rashes (50% vs. 33%).

In sum, while these data do not prove that living closer to oil and gas facilities causes health problems, they do suggest a strong association since symptoms are more prevalent in those living closer to facilities than those living further away. Symptoms such as headaches, nausea, and pounding of the heart are known to be the first indications of excessive exposure to air pollutants such as VOCs [36], while the higher level of nosebleeds in the youngest age group is also consistent with patterns identified in health survey projects in other states [9, 10].” P.64

Earthworks, a non-profit organization, conducted the Pennsylvania study referred to above, (Gas Patch Roulette 2012) in which they surveyed residents about health symptoms and conducted air and water tests near residences in Pennsylvania and New York. In their report, specific mention is given of a residence 800 feet from a compressor station. Health symptoms experienced by the residents (parents and children) were extreme tiredness, severe headaches, runny noses, sore throats and muscle aches, as well as dizziness and vomiting by one individual.

Based on data from the Town Assessor’s office (Table 1), 17 year-round residences are located within ½ mile (2,640 feet) of the proposed compressor station and 30 residences are within 1 mile (5,280 feet). The nearest residence is 1,150 feet from the site. Symptoms reported in the Pennsylvania study, primarily throat irritation, sinus problems and headaches could potentially be experienced by town residents within
these distances. Numerous additional symptoms are possible and would vary depending upon the age and overall health of individuals.

Earthworks also conducted a health survey in Dish, Texas in 2009. The health symptoms reported to be associated with compressors were: burning eyes, nausea, headaches, running nose, sore throat, asthma, sinus problems and bronchitis. Odors experienced by residents near compressor stations were described as: sulfur smell, odorized natural gas, burnt wire, strong chemical-like smell and ether.

Wilma Subra, an environmental chemist and consultant who is on the Earthworks Board of Directors, has compiled information on health symptoms experienced near compressor stations based on her research with communities concerned about health impacts from UNGD. Subra has served as Vice-Chair of the Environmental Protection Agency National Advisory Council for Environmental Policy and Technology (NACEPT), and recently completed a five year term on the National Advisory Committee of the U.S. Representative to the Commission for Environmental Cooperation and a six year term on the EPA National Environmental Justice Advisory Council (NEJAC) where she served as a member of the Cumulative Risk and Impacts Working Group of the NEJAC Council. While her research on health impacts associated with compressor stations is reported back to communities, most of the data shown here have not been published in peer-reviewed journals (she is an author on the above-mentioned peer-reviewed article on Pennsylvania data).

Subra has reported the following health impacts in association with compressor stations:

Table 2. Most Prevalent Medical Conditions In Individuals Living in Close Proximity to Compressor Stations and Metering Stations

<table>
<thead>
<tr>
<th>Medical Conditions</th>
<th>% of Individuals (71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Impacts</td>
<td>58</td>
</tr>
<tr>
<td>Throat Irritation</td>
<td>55</td>
</tr>
<tr>
<td>Weakness and Fatigue</td>
<td>55</td>
</tr>
<tr>
<td>Nasal Irritation</td>
<td>55</td>
</tr>
<tr>
<td>Muscle Aches &amp; Pains</td>
<td>52</td>
</tr>
<tr>
<td>Vision Impairment</td>
<td>48</td>
</tr>
<tr>
<td>Sleep Disturbances</td>
<td>45</td>
</tr>
<tr>
<td>Sinus Problems</td>
<td>42</td>
</tr>
<tr>
<td>Allergies</td>
<td>42</td>
</tr>
<tr>
<td>Eye Irritation</td>
<td>42</td>
</tr>
<tr>
<td>Joint Pain</td>
<td>39</td>
</tr>
<tr>
<td>Breathing Difficulties</td>
<td>39</td>
</tr>
<tr>
<td>Severe Headaches</td>
<td>39</td>
</tr>
</tbody>
</table>
The full list of health impacts “Reported by Community Members Living 50 feet to 2 miles from Compressor Stations and Gas Metering Stations Along Gas Transmission Pipelines” is available at the Luzerne County Citizens for Clean Air website\textsuperscript{91}. It is notable that Subra reports that 61% of health impacts are associated with the chemicals present in the air that were in excess of short and long term effects screening levels.

Subra further reports that the following units at compressor stations and gas metering stations release emissions into the air:

- Compressor Engines
- Compressor Blowdowns
- Condensate Tanks
- Storage Tanks
- Truck Loading Racks
- Glycol Dehydration Units
- Amine Units
- Separators
- Fugitive Emission Sources

She reports that 90% of individuals surveyed reported experiencing odor events from these facilities. Based on her analysis, the following health symptoms are associated with the chemicals detected in the air at compressor stations:

- Allergies
- Persistent Cough
- Shortness of Breath
- Frequent Nose Bleeds
- Sleep Disturbances
- Joint Pain
- Difficulty in Concentrating
- Nervous System Impacts
- Forgetfulness
- Sores and Ulcers in Mouth
- Thyroid Problems

Subra reports that both the construction and production phases of compressor stations can cause acute and chronic impacts. In the construction phase impacts come from diesel truck emissions and from dust particles. In the production phase impacts are derived from constant emissions, venting, blowdowns, accidents/malfunctions and from the effects of noise, light and stress. She considers respiratory health impacts of particular concern, and vulnerable groups such as pregnant women, children, the elderly and sensitive individuals to be at greatest risk. Acute and chronic health impacts that Subra has documented are listed below.

**Acute Health Impacts Experienced by Individuals Living and Working near Compressor Stations**
Tense and nervous
Joint and muscle aches and pains
Vision Impairment
Personality changes
Depression, Anxiety
Irritability
Confusion
Drowsiness
Weakness
Irregular Heartbeat

Irritates skin, eyes, nose, throat and lungs
Respiratory impacts
Sinus problems
Allergic reactions
Headaches
Dizziness, Light headedness
Nausea, Vomiting
Skin rashes
Fatigue
Weakness

Chronic Health Impacts Experienced by Individuals Living and Working near Compressor Stations

Damage to Liver and Kidneys
Damage to Lungs
Damage to Cardiovascular System
Damage to Developing Fetus
Reproductive Damage
Mutagenic Impacts
Developmental Malformations

Damage to Nervous System
Brain Impacts
Leukemia
Aplastic Anemia
Changes in Blood Cells
Impacts to Blood Clotting Ability

Radioactive elements: a long-term health threat

The possibility of exposure to radiation from natural gas pipelines and compressor stations is also a concern, especially for long-term health effects. The New York public health group, Concerned Health Professionals of New York, describes the problem in their report, *Compendium Of Scientific, Medical, And Media Findings Demonstrating Risks And Harms Of Fracking (Unconventional Gas And Oil Extraction) (July 10, 2014): “Unsafe levels of radon and its decay products in natural gas produced from the Marcellus Shale, known to have particularly high radon content, may also contaminate pipelines and compressor stations, as well as pose risks to end-users when allowed to travel into homes.”*(P.5). Health impacts from exposure to radioactive materials in compressor station emissions have not been documented, but the risk of exposure to these carcinogens are a serious public health concern.

V. Concerns from residents

FERC is required by NEPA to address concerns reported by local residents in the permitting process. Engaging community members in this process can effectively inform decision-making that ultimately improves public safety.92,93
In the public comments submitted to FERC by residents and in comments submitted to the MCDOPH, concerns about health risk are a priority. In reviewing these comments we found that of the 15 individuals who submitted comments to FERC the top 10 concerns mentioned were:

Food safety (risks to crops/farms/gardens and consumers) 10
Health risks (including risks to children) 9
Home values (resale, insurance, mortgage) 9
Air pollution 8
Environment 8
Water pollution 7
Noise pollution 7
Safety record of compressors 7
Rural character of community disruption 7
Wildlife 7

Of the 21 comments written to the MCDOPH during and following two public information meetings the top ten concerns were:

Health Risks (including risks to children) 19
Food safety (Risks to crops/farms/gardens and consumers) 16
Air pollution 15
Noise pollution 14
Safety record of compressors 11
Water pollution 11
Emergency response 9
Rural character of community disruption 7
Home values (resale, insurance, mortgage) 7
Pipeline safety 5

Health safety and food safety are the top concerns for these residents. While the risks to health from potential chemical exposure is documented (and summarized above in relation to compressors), less is known about the route of exposure from air emissions through soil and food pathways. There are reports of soil contamination from UNGD caused by spills, leaks and underground contamination. For this industry, we found no documentation of soil and plant contamination from air pollutants, but the pathway for contamination through air is well documented. Thus concerns about food safety related to air emissions should not be discounted.

There is evidence of loss of property values near UNGD sites, though not specifically addressing to compressor stations. Risks to wildlife and local habitats from UNGD has been addressed in the literature by Kiviat (2013). Concern about accidents,
emergency response, compressor safety records and pipeline safety are related issues that bear on public health. In fact, each of the concerns listed above is related, directly or indirectly to public health. From the broad scope of “environment” and “rural community character” to the specifics of safety records and emergency response, these issues impact the health and wellbeing of the local community. These concerns can best be addressed through a thorough assessment of health risks.

VI. Recommendations for framing and scoping the public health issues for the Sheds compressor station:

FERC should consider expanding the scope of its public health analysis on the Sheds compressor station to address the concerns raised in this report to ensure that public health is not endangered in Madison County. To protect public health it is necessary to know whether dangerous spikes in pollutants will ever occur at this compressor station, how often, and what the health effects would be for nearby residents in the short and the long term. The important impact of local weather conditions on exposure profiles also needs to be considered.

To adequately assess human health impacts public health professionals and analysts would need to know:

- The pathways of exposure (air, water, soil)
- The intensity of the exposure
- The frequency of the exposure
- The duration of the exposure
- Interaction of components of the chemical mixture
- Length of time living near the compressor station

Public health professionals understand that:

- Chemical toxicity in the human body can occur within minutes or hours of exposure.
- Repeated episodic exposures increase the damage.
- High exposures to chemicals increase the seriousness of the damage.
- Understanding the variability of exposure is essential.

The need for a public health perspective in the process of regulating UNGD including transportation infrastructure has been presented in peer-reviewed journals, at scientific conferences and in public comments to State officials. See the following references:

A. Wernham, “Health Impact Assessment for Shale Gas Extraction,”

Adgate et al (2014) report that:
“... pollution from UNG development originates from (1) direct and fugitive emissions of methane and nonmethane hydrocarbons from the well and associated infrastructure (e.g., production tanks, valves, pipelines, and collection and processing facilities); (2) diesel engines that power equipment, trucks, and generators; (3) drilling muds, fracturing fluids, and flowback water; and (4) deliberate venting and flaring of gas and related petroleum products.” (page D)

They further state that:
“Pilot studies in Colorado’s Piceance Basin, Pennsylvania’s Marcellus, and Texas’s Barnett Shale indicate that VOCs, including C2− C8 alkanes, aromatic hydrocarbons, methyl mercaptan, and carbon disulfide, are emitted during well completions as well as from compressors, condensate storage tanks and related infrastructure.” (page E)

The lack of environmental public health expertise on advisory panels at the state and federal levels has also been addressed by:


Baseline health data and environmental data: where to find it

Baseline health data provides the foundation for effective public health assessments. Numerous sources are available to develop a baseline dataset for specific locations and to identify susceptible populations. Primary resources are listed below.

The gathering of environmental data for assessment of health impacts would, in the case of compressor station air emissions, require accessing data on a subset of known chemicals emitted at similar sites (e.g. a similar size compressor station during normal operation including blowdowns and venting). The monitoring protocols at existing sites would need to address the realtime variations at compressor stations, capturing peak emissions as well as duration of peaks. Public health officials could then more accurately estimate health impacts for both acute and cumulative exposures to the local population.

Local baseline health statistics are necessary so that risk can be assessed in relation to a specific population. Baseline data sources include County, State and Federal health statistics databases. Nongovernmental resources include the American Lung
Association, American Cancer Society and the National Cancer Institute. Recommended baseline health topics and sources of data are listed below.

**Physical health determinants:**
- Major causes of morbidity and mortality: CDC Wonder; National Cancer Institute
- Life expectancy: CDC’s Community Health Status Indicators
- Poor physical health days: Behavioral Risk Factor Surveillance System (BRFSS)
- Chronic disease: BRFSS
- Identification of vulnerable populations: County level health data and sociodemographic data
- Birth outcomes: Health Indicators Warehouse and National Vital Statistics System
- School data: New York State Department of Health, Health Data NY, Schools, Statistics and Chronic Diseases
- Hospital data: New York State Department of Health, Health Data NY, Hospital reports

**Environmental health determinants:**
- Baseline local air quality: requires targeted monitoring in addition to current NAAQS data
  - To estimate the impact of compressor station air emissions MCDOH suggests site specific air monitoring from comparable compressor stations to capture the intensity, duration and frequency of peak emissions that could impact public health (including blowdowns). A subset of known chemicals could be tested for including but not limited to BTEX, methylene chloride, formaldehyde, PM$_{2.5}$ and ultrafine particles.
  - This can be followed by the modeling of emissions dispersion that takes local topographic and meteorological data into consideration. In this way the potential for spikes in exposures can be estimated for different locations.
- Soil health: perform baseline soil tests for relevant chemicals to establish baseline levels in case of future potential contamination of local yards, play areas and gardens as well as local agricultural fields and farm products.
  - To be followed by periodic soil tests if permit is granted.
- Baseline local water quality: requires targeted testing of local wells and surface waters [of concern to residents]
  - To be followed by periodic monitoring of local water resources if permit is granted.
- Noise levels: compare current and projected levels.
- Traffic: compare current and projected levels.
- Construction: assess projected impacts from dust and diesel emissions.
Suggested references of reports that assess health impacts, including cumulative risks, related to UNGD

University of Maryland: Potential Public Health Impacts of Natural Gas Development and Production in the Marcellus Shale in Western Maryland. Maryland Institute for Applied Environmental Health School of Public Health University of Maryland, College Park. July 2014.\textsuperscript{107}

New Brunswick, Canada: Chief Medical Officer of Health’s Recommendations Concerning Shale Gas Development in New Brunswick. Office of the Chief Medical Officer of Health, New Brunswick Department of Health. 2012.\textsuperscript{108}

Colorado School of Public Health: Battlement Mesa Health Impact Assessment, Colorado School of Public Health, February, 2011 \textsuperscript{109}

State of Alaska: Health and Social Services Alaska Health Impact Assessment Program\textsuperscript{110}

VII. Data gaps and other challenges for implementing a health assessment:

There are a number of knowledge gaps that make it difficult to perform a thorough public health analysis, yet each such effort contributes to the broader challenge of understanding the health consequences of living near UNGD installations, including compressor stations.

1. Baseline health studies: Studies on health status before infrastructure development are lacking, yet are critical for measuring health impacts.\textsuperscript{111} Currently little is known about the direct consequences of living near these sites. Baseline studies in relation to UNGD are needed and should be followed by health status monitoring during development and production phases.

2. Chemical constituents: More site specific monitoring is needed to quantify and qualify the chemical constituents of compressor station emissions. Emissions can vary between sites as well as over time at each site. Normal operations will produce different emissions from venting, blowdowns or accidental releases. Targeted monitoring can help address this gap by providing information on the chemical identities and quantities along with timeline and duration of emissions that may lead to exposures.

3. Chemical toxicity and chemical mixtures: information on toxicity is lacking for some chemical constituents that have yet to be thoroughly studied. With no health standards, risks are difficult to assess. Even when health standards for each chemical
are known, understanding risks to chemical mixtures in air emissions poses a greater challenge. Research on how chemicals react with each other, as well as how mixtures then affect the human body are sorely lacking. These data gaps can be mitigated to some extent by conducting health impact assessments.

4. Pipeline and metering station emissions: In addition to compressor stations, pipelines and metering stations also emit chemicals into the air. These emissions contribute to both environmental and public health impacts. Targeted monitoring would help in assessing regional air quality impacts, as well as local impacts for residential areas.

5. Radioactive emissions: Natural gas sourced from shale plays is known to contain radioactive elements. These elements build up in pipeline scale. The extent to which radioactive materials are emitted during venting, blowdowns or other events is not well known. Monitoring specifically for harmful radioactive substances is needed.

6. Air dispersion modeling: Determining how emissions travel from a source to nearby residents is an important part of understanding human exposure. The topography and the weather patterns of each local environment affect dispersal patterns. Consequently some residents may be impacted more than others. Targeted air dispersion modeling for specific industrial sites can contribute to anticipating local health impacts.

7. Soil and farm products: With the increased placement of natural gas transmission infrastructure through rural farming communities, the need for monitoring soils and farm products for chemical contamination also increases. As chemical constituents are identified, targeted soils and food testing can help bridge this knowledge gap.

VIII. Recommendations and mitigation (if permit granted)

In the event that the DTI New Market project is permitted by FERC, MCDOH would make the following recommendations so that public health can be adequately addressed:

1. **Perform a baseline health study to establish population health status before the compressor station is built.**
   - A baseline health study would allow MCDOH to monitor and measure health impacts over time and support the development and initiation of mitigation for health consequences if any are found.
   - A baseline study that includes air pollution monitoring would provide data to distinguish between background and additional impacts from compressor station emissions. With indoor air monitoring in residences, distinctions could be made between the use of natural gas in the home on a regular basis and the potential impact of emissions dispersing into residences. For example, a measure of spikes
that might occur from cooking (short-term) would look different from longer-term spikes that result from outdoor air pollution, or nighttime spikes that might occur due to weather conditions.

2. Require best practices to ensure that effective emissions control measures are kept up to date.

Technology is rapidly changing in this industry and while some improvements have been made in emissions controls and environmental impacts, there is room for more improvement. To protect public health, MCDOH recommends that upgrades to equipment be required for continued operation of the compressor station.  

The health effects of living near compressor stations include impacts from this constant source of noise. To reduce these health effects MCDOH requests the implementation of special noise abatement measures such as those in use at the Minisink Compressor Station. These include the addition of an “internal mass septum layer for the compressor building walls and roof; additional baffle length for the first and second stage exhaust silencers; high performance turbine exhaust and air inlet systems; low noise turbine lube oil coolers; and unit blowdown silencers.” It should be noted, however, that some residents near the Minisink Compressor station continue to report that noise and vibrations interfere with their quality of life. Continued upgrades would help to mitigate ongoing effects.

3. Establish an alert system for blowdowns or other large emissions and/or noise events. These types of events, while considered a normal part of compressor station operations, can potentially cause health effects for nearby residents. A system that alerts residents to the intensity and duration of these events is recommended.

4. Put Emergency Plans in place. The application filed by DTI states that the company is not required by the USEPA to prepare a risk management plan for the New Market Project. Because of the risk of chemical accidental (or intentional) release at levels that could harm human health, MCDOH recommends that emergency plans be put in place for both pipeline release events, metering station events and compressor station accidents. In association with emergency plans, MCDOH further recommends that:
   - First responders be properly trained for these specific scenarios
   - Local health providers receive training for specific environmental exposures
   - An evacuation plan is put in place

5. Institute a monitoring strategy at the Sheds compressor station and surrounding locations. To adequately protect public health it is necessary to measure air emissions at the source and to determine air pollution impacts locally. MCDOH recommends monitoring air emissions such as formaldehyde, VOCs and particulate matter at residences within one mile of the compressor station. MCDOH also recommends monitoring impacts to soil and crops within one mile of the compressor station to
assess impacts on farm products. With realtime monitoring in place, DTI would have
the capability to respond to events that jeopardize human health and adjust venting
events accordingly.

6. Institute a health registry. MCDOH recommends that a regional health registry be
established so that long-term health effects from natural gas infrastructure, including
the Sheds compressor station, can be adequately assessed. Ideally this registry would
be part of a larger state and/or national level registry, since the infrastructure for
natural gas energy is increasing across the USA.

IX. Summary of Questions for FERC to address in assessing risks to public health

1. What is the health status of the local population?
2. What chemicals will be emitted, at what concentrations and in what mixtures?
3. How often do releases occur (frequency), how long do they last (duration) and at
what intensities? What times of day do they occur?
4. What is the health effect downwind, especially at night for residences within 1 mile
of the compressor?
5. Will radioactive material be emitted (intentionally, as fugitives or accidentally) and if
so, at what levels?
6. Are adequate emergency/notification plans in place?
7. Are adequate mitigation strategies in place?

X. Glossary of Abbreviations

CDC   Centers for Disease Control
DTI   Dominion Transmission, Incorporated
EPA   Environmental Protection Agency
HAP   Hazardous Air Pollutants
MCDOH Madison County Department of Health
NAAQS National Ambient Air Quality Standards
PM   Particulate Matter
REL   Reference Exposure Level
UNGD Unconventional Natural Gas Development
VOC   Volatile Organic Compound
USA   United States of America
USEPA United States Environmental Protection Agency
FERC Notice of Intent to Prepare an Environmental Assessment for the Proposed New Market Project, Request for Comments on Environmental Issues and Notice of Public Scoping Meeting. Letter Dated September 18, 2014. Received by the Madison County Department of Health.


DTI Application, p. 9-17.
6 DTI Application, Table 9.1-4, p. 9-18
7 DTI Application, p.9-18.
8 DTI Application, Appendix 9-A,
9 DTI Application, p.9-26.
10 DTI Application, p.9-25.
14 Ibid., Appendix A, p.31.
17 Ibid.

Southwest Pennsylvania Environmental Health Project internal review of intake materials, August 2014.


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http://www.epa.gov/tnn/atw/hlthef/methylen.html
http://www.epa.gov/tnn/atw/orig189.html


Personal communication, David Carpenter. August 20, 2014. Research article under review.


http://www.epa.gov/pm/health.html


Ibid.


Ibid.


Ibid.


75 Mills NL et al. 2007.


79 http://ehp.niehs.nih.gov/122-a110/

80 For additional information see, for instance, EPA’s Integrated Risk Information System database.

81 Babisch W. Transportation noise and cardiovascular risk: Updated review and synthesis of epidemiological studies indicate that the evidence has increased. Noise & Health 2006; 8(30):1-29.


89 Wilma Subra, President, Subra Company P. O. Box 9813 New Iberia, La 70562.
91 Ibid.
94 Two of these written comments came from four residents (married couples) who also sent comments to FERC.
96 Laramie, R. Expanded site investigation - analytical results report. URS Operating Services, Inc., 2010; 1-86.
98 Orrechio, S. Contamination from polycyclic aromatic hydrocarbons (PAHs) in the soil of a botanic garden localized next to a former manufacturing gas plant in Palermo (Italy) Journal of Hazardous Materials 2010; 180:590-601.
101 Radow, EN. Homeowners and Gas Drilling Leases: boon or bust? New York State Bar Association Journal (2011) v.83 no.9
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http://www.epi.alaska.gov/hia/


Health Impact Assessment of Shale Gas Extraction: Workshop Summary - Workshop On The Health Impact Assessment Of New Energy Sources: Shale Gas Extraction. Sponsored By Roundtable On Environmental Health Sciences, Research, And Medicine April 30–May 1, 2012, House Of Sweden, 2900 K Street NW, Washington, DC. Copyright National Academy of Sciences. “For example, for compressor stations, technology such as oxidation catalysts, selective catalytic reduction, and stoichiometric combustion engines with three-way catalysts can reduce the emissions of NOx, VOCs, and formaldehyde.”

November 18, 2015

Federal Energy Regulatory Commission
888 First Street, NE, Room 1
Washington, DC 20426

RE: Environmental Assessment; Dominion New Market Project: CP 14-497-000

Dear Commissioners:

Please accept the following comments regarding the Environmental Assessment prepared by your staff for the Dominion Transmission, Inc. “New Market Project” (CP14-497-000).

Otsego 2000 is a historic preservation and conservation organization committed to a sustainable future in which people live in harmony with the environment rather than placing greater burden upon the planet, its air and water resource, and climate. We understand that the expansion of fossil fuel infrastructure, including natural gas, challenges this. However, we also recognize the value of working to find collaborative solutions, which is why we have repeatedly provided comments on how impacts can be reduced if this project moves forward. In particular, we have recommended ways to reduce impacts of the compressor station expansion at Brookman Corners in Montgomery County, projected to produce emissions much higher than from Dominion’s other proposed facilities.

Unfortunately, the Environmental Assessment prepared by FERC staff is woefully inadequate, falling far short of an objective, comprehensive analysis necessary to support a finding of no significant impact. As explained below, we are disappointed by your staff’s disregard for our input, its failure to recommend any meaningful changes to the project, and its failure to address or even acknowledge many of our comments. We are also concerned by staff’s unwillingness to consider the special needs of communities, including Amish and Mennonite families that would be most severely impacted by this project.
Having said this, we continue to believe that a better outcome is possible. Therefore, instead of preparing a pro forma response to these comments and issuing a finding of no significant impact, we urge you and your staff to meaningfully consider our prior comments and those provided here, and to revise its analysis with useful recommendations for how impacts of the project can be reduced. The best mechanism for this would be through the preparation of an Environmental Impact Statement (EIS), which we continue to believe is the most appropriate method of review for a project of this size affecting a 200 mile long corridor with multiple facilities and cumulative impacts. Regardless of the approach taken, however, the recommendations of your staff should be revised.

Respectfully, it is no secret that FERC has developed a reputation for being a rubber stamp for the gas industry. This is an opportunity to demonstrate otherwise. Our specific concerns and objections follow.

Sincerely,

Nicole A. Dillingham, Esq.  Keith W. Schue
President, Otsego 2000  Member, Otsego 2000
Board of Directors  Environmental Stewardship Committee

CC:

Background

Dominion’s “New Market Project” is a major proposal to increase the flow of natural gas in its pipeline network which originates in the Marcellus and Utica fracking regions of Pennsylvania, West Virginia, and Ohio. The project encompasses a 200 mile-long, 50-year old pipeline corridor through New York with new, expanded, or modified facilities planned in six counties. This includes compressor stations in Horseheads (Chemung County), Sheds (Madison County), and Brookman Corners (Montgomery County).

Today, the Brookman Corners compressor station in the Town of Minden is a small facility with a single 7410 HP turbine compressor that runs only about once a week. However as part of its proposed “New Market Project,” Dominion plans to significantly expand this to 18,543 HP in order to transport an additional 112,000 Dekatherms of gas per day. This includes 82,000 Dekatherms per day that would be transferred to the Iroquois pipeline. As proposed, the project involves the addition of a second 6393 HP turbine compressor, two 2370 HP reciprocating compressors, coolers, and other equipment.

Due to equipment proposed and limited emission controls, the Brookman Corners compressor station would produce levels of hazardous pollutants much higher than from Dominion’s other two compressor stations planned in Horseheads or Sheds. According to Dominion’s own data, formaldehyde levels would be 22 times higher, volatile organic compounds (VOCs) 14 times higher, carbon monoxide (CO) five times higher, nitrogen oxides three times higher, and particulate matter twice as high as at the other two sites. Negative health effects of exposure to these chemicals include cardiovascular, respiratory, and neurological damage; birth defects, cancer; leukemia; infertility; burning of lungs, eyes, and throat; muscle pain; mental impairment, headaches, and a host of other acute and chronic illnesses.

Further, greenhouse gas emissions would be nearly twice as high at Brookman Corners, falling just under the 100,000 ton/year threshold triggering Title V review. Significantly, this does not include blowdowns, start-up emissions, long-term fugitive emissions that tend to increase over time, and equipment excluded from FERC’s assessment (such as dehydrators at the Dominion/Iroquois metering station located only a few hundred feet away). If these other sources are included, greenhouse gases and pollutants dangerous to human health would be even higher. Since the purpose of the compressor station at Brookman Corners substantially changes with its connection to the Iroquois system, the facility would also operate far more, exposing nearby the residents and communities downwind to dangerous pollutants on an ongoing basis.

These concerns are compounded by the topography of the Otsquago valley that is likely to limit the dispersion of emissions. Located next to Otsquago creek, the Brookman Corners compressor station is in the center of a drainage basin that extends from Van Hornesville to the village of Fort Plain. At night air can stabilize above cooler waters of the creek, creating a temperature inversion that causes emissions to settle in the valley. Furthermore, the top of proposed exhaust stacks at the facility are at a lower elevation than the valley rim, which could concentrate emissions for longer periods of time near the surface and eventually carry them downwind to Fort Plain. This is particular a concern for reciprocating compressors, which are less effective at propelling combustion emissions into the atmosphere than turbines (especially under varying
load conditions), and which produce more fugitive emissions that are vented at low velocity near the ground. Dominion has failed to consider these factors in its analysis, instead modeling dispersion based on wind patterns from Rome, NY and Albany, NY located fifty miles away.

Finally, Dominion’s compressor station at Brookman Corners is surrounded by a very large community of Amish and Mennonite families, who subscribe to a traditional agrarian way of life and often spend their entire lives in a single area. Every breath they take and almost every bite of food this community consume comes from the air and land immediately around them. As such, they are particularly vulnerable to pollutants in the environment. Furthermore, because they have large families, many are children. In fact, four Amish schoolhouses are located very close to Dominion’s proposed project. It is well established that children are particularly sensitive to toxins in the environment, because of their immature and sensitive respiratory, kidney, and endocrine systems. Due to their traditional ways, many do not receive regular modern medical services.

All of these factors contribute to greater risk, thereby creating a compelling argument for improvements to the proposed project that would reduce exposure.

1. **Environmental Impact Statement Should Have Been Prepared**

As discussed extensively in comments from numerous organizations, individuals, and local governments, an Environmental Impact Statement (EIS) should have been prepared for this project, rather than an abbreviated Environmental Assessment (EA). In fact numerous resolutions calling for an EIS have been adopted by local governments, especially those in the region surrounding Brookman Corners that would suffer the greatest impacts to air quality. These include but are not limited to the towns of Minden, Canajoharie, Springfield, Cherry Valley, Roseboom, Middlefield, and Otsego, the villages of Fort Plain and Sharon Springs, and Montgomery County.

Dominion’s “New Market Project” spans 200 miles of New York State, from the Pennsylvania border to Schenectady, with new facilities or modifications in six counties. This includes new or expanded compressor stations that would pump over 200,000 tons of additional greenhouse gases and hazardous pollutants into the atmosphere annually. Together, the project introduces significant, complex, and inter-related impacts affecting air quality, public health, greenhouse gas emissions, noise, pipeline integrity, safety, and security in addition to potential upstream and downstream impacts. Further, the additional stress caused by moving increased amounts of gas through Dominion’s 50-year old pipeline increases the potential for leakage, rupture, fire, explosion, or other catastrophic incident, thereby exposing residents and communities along the entire corridor to greater risk. An EIS should have been prepared to consider all of these direct, indirect, and cumulative impacts. (National Environmental Policy Act (“NEPA”), 40 CFR. § 1508.25.)
Preparing an EIS would have also allowed for greater public participation, including public comment on a draft EIS prior to its completion. As documented in December 3, 2014 scoping comments by Otsego 2000, the project has been plagued with numerous mistakes and intolerance by FERC staff which have thwarted public participation, including poorly conducted scoping meetings, inadequate meeting room accommodations, and unwillingness by staff to hold scoping meetings in the areas—including Brookman Corners—that would be most affected. A large portion of the community surrounding Brookman Corners are Amish, who do not drive and are therefore physically unable to travel long distances. Yet despite the persistent request of elected leaders and affected residents, no attempt was made by FERC to accommodate the special needs of this population.

Significantly, according to Section 617.15 of the New York State Environmental Quality Review Act (SEQR), the New York State Department of Environmental Conservation may only waive the requirement for a state-level EIS if a draft and final EIS has been prepared by the applicable federal agency. Since only an Environmental Assessment (EA) has been issued by FERC without any draft for public review, this condition has not been satisfied.

Regulations implementing NEPA allow the Commission to require an EIS if it determines that the Environmental Assessment that has been prepared is insufficient. This is clearly the case for Dominion’s “New Market Project,” so the Commission should require a full Environmental Impact Statement.

2. **Improvements Alternatives to Reduce Emissions Not Considered**

The primary focus of comments by Otsego 2000 over the past year has been to encourage design improvements at the Brookman Corners compressor station that would reduce emissions. In its application to FERC, Dominion claims to be using Best Available Control Technology (Resource Report #9, page 9-11). However, this is not supported by the fact that readily available methods exist to substantially reduce emissions, which have not been implemented. We discussed this in our initial scoping comments on the project dated December 3, 2014, and in greater detail through subsequent comments dated January 13, 2015, April 15, 2015, and July 6, 2015. Nonetheless, staff’s Environmental Assessment neglected to require, recommend or even respond to our suggestions.

Significantly, two of the emission reducing features identified below (addition of an oxidation catalyst and vapor recovery) would not even require any change in the configuration of equipment proposed. We discuss these recommendation again below.
A. Installation of an Oxidation Catalyst

The most obvious example of an improvement that Dominion has failed to incorporate into its proposed project at Brookman Corners is the installation of an oxidation catalyst on its existing Taurus 60 turbine. This is analogous to the catalytic converter on an automobile. Comparing emissions of the two turbines proposed in the expanded project (one with and one without an oxidation catalyst), it is very apparent that this missing component contributes significantly to total levels of formaldehyde, carbon dioxide, and nitrogen oxides.

**Brookman Corners Emissions Summary**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Taurus 60 7410HP (tons/year)</th>
<th>Centaur 50L 6393HP (tons/year)</th>
<th>2 x Cat G3608 2370HP each (tons/year)</th>
<th>Cat G3516 standby gen (tons/year)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>0.86</td>
<td>0.07</td>
<td>1.2</td>
<td>0.12</td>
<td>2.2</td>
</tr>
<tr>
<td>VOC</td>
<td>0.9</td>
<td>0.4</td>
<td>14.4</td>
<td>0.6</td>
<td>24.3*</td>
</tr>
<tr>
<td>CO</td>
<td>17</td>
<td>1.6</td>
<td>12.6</td>
<td>2.3</td>
<td>33.4</td>
</tr>
<tr>
<td>NOx</td>
<td>27.9</td>
<td>14.4</td>
<td>22.9</td>
<td>1.2</td>
<td>66.3</td>
</tr>
<tr>
<td>PM-10/PM-2.5</td>
<td>4.6</td>
<td>3.9</td>
<td>4.6</td>
<td>0.1</td>
<td>13.1</td>
</tr>
<tr>
<td>SO2</td>
<td>0.5</td>
<td>0.4</td>
<td>0.23</td>
<td>0.003</td>
<td>1.1</td>
</tr>
<tr>
<td>GHG</td>
<td>35,676</td>
<td>30,779</td>
<td>24,439</td>
<td>277</td>
<td>96,683**</td>
</tr>
</tbody>
</table>

Note: 8760 hours/year operation for each, except the standby generator at 500 hours/year.
* includes 8.0 tons/year for fugitive emissions
** includes 5,512 tons/year for fugitive methane emissions

Using emissions data for the proposed Centaur 50L turbine at Brookman Corners and scaling relative to horsepower, it can easily be seen that adding an oxidation catalyst to the existing Taurus 60 turbine at Brookman Corners would reduce levels of formaldehyde, carbon monoxide, and nitrogen oxides significantly. (Similar estimates can be obtained by using projected emissions for Dominion’s Taurus 70 turbine at Horseheads or Sheds and scaling down.)
As illustrated below, adding an oxidation catalyst onto the existing Taurus 60 turbine at Brookman Corners would reduce total emissions of formaldehyde by 33%, carbon monoxide by 45%, and nitrogen oxides by 17%. This is a straight-forward, cost-effective improvement that would significantly improving air quality, so there is no excuse for it not to be done.

### Effect of Adding an Oxidation Catalyst on Taurus 60 Turbine at Brookman Corners

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Taurus 60 7410HP (tons/year)</th>
<th>Centaur 50L 6393HP (tons/year)</th>
<th>2 x Cat G3608 2370HP each (tons/year)</th>
<th>Cat G3516 standby gen (tons/year)</th>
<th>Total</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>0.86</td>
<td>0.07</td>
<td>1.2</td>
<td>0.12</td>
<td>2.2</td>
<td>1.47</td>
</tr>
<tr>
<td>VOC</td>
<td>0.9</td>
<td>0.4</td>
<td>14.4</td>
<td>0.6</td>
<td>24.3</td>
<td>23.9 *</td>
</tr>
<tr>
<td>CO</td>
<td>17</td>
<td>1.6</td>
<td>12.6</td>
<td>2.3</td>
<td>23.4</td>
<td>18.4</td>
</tr>
<tr>
<td>NO\textsubscript{x}</td>
<td>27.9</td>
<td>14.4</td>
<td>22.9</td>
<td>1.2</td>
<td>66.3</td>
<td>55.2</td>
</tr>
</tbody>
</table>

Note: 8760 hours/year operation for each, except the standby generator at 500 hours/year.

* includes 8.0 tons/year for fugitive emissions

We maintain that since the Taurus 60 turbine at Brookman Corners is co-located with new emission sources at the same facility, it is necessary and appropriate for this improvement be incorporated, consistent with BACT.\(^1\) However, even if FERC staff believes that new source rules can be satisfied without installing an oxidation catalyst on the existing Taurus 60 turbine, our comments on the matter should have been discussed in its Environmental Assessment and the addition of an oxidation catalyst included as a recommendation.

An oxidation catalyst is standard equipment today. In fact Dominion intends to install one at both of its facilities in Horsehead and Sheds where emissions would be much lower, and on the new turbine and reciprocating engines proposed at Brookman Corners. It therefore makes sense to retrofit the existing Taurus 60 turbine too. Given that the community surrounding Brookman Corners is being asked to accept much higher emissions in the future, it is both reasonable and appropriate for Dominion to install an oxidation catalyst to limit those emissions as much as possible.

Otsego 2000 submitted comments to this effect on April 15, 2015 and July 6, 2015. However without explanation, those comments have been ignored in FERC’s Environmental Assessment.

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\(^1\) [http://www.dec.ny.gov/chemical/30681.html](http://www.dec.ny.gov/chemical/30681.html)
B. Consolidation or Substitution of Turbines

Dominion has never explained, nor has FERC inquired, as to why two turbines are proposed at Brookman Corners instead of one. Brookman Corners is located near the end of Dominion’s pipeline. Furthermore, according to the “New Market Project” application, about three quarters of the additional gas proposed for transport (82,000 Dekatherms/day) is intended for transfer to the Iroquois pipeline using reciprocating compressors. It is therefore not apparent why an additional turbine almost equal in size to the existing, currently under-utilized Taurus 60, is needed.

In comments dated April 15, 2015 and July 6, 2015, Otsego 2000 suggested that if this much additional horsepower is indeed needed at Brookman Corners, it could be accomplished by replacing the existing Taurus 60 and proposed Centaur 50L turbine with a Taurus 70 turbine (with oxidation catalyst). This would be equivalent to the turbine that Dominion plans to install at Horseheads and Sheds. Doing this would reduce not only hazardous pollutants, but also total greenhouse gas emissions, which would drop by 25%. Furthermore, it would eliminate one exhaust stack and could reduce the required size of the compressor building at that Dominion intends to enlarge. The effect of installing a single Taurus 70 turbine at Brookman Corners in place of the two turbines proposed is illustrated below. Although not included in our estimate, this would also likely result in the additional reduction of fugitive emissions, including both VOCs and methane.

**Effect of Replacing Taurus 60 and Centaur 50L Turbines with a Single Taurus 70 Turbine**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Taurus 60 7410HP</th>
<th>Centaur 50L 6393HP</th>
<th>2 x Cat G3608 2370HP each</th>
<th>Cat G3516 standby gen</th>
<th>Total</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Taurus 70 11,000 HP (tons/year)</td>
<td>6,100 HP (tons/year)</td>
<td>22,200 (tons/year)</td>
<td>22,900 (tons/year)</td>
<td>4,498 (tons/year)</td>
<td>-35%</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>0.86</td>
<td>0.07</td>
<td>1.2</td>
<td>0.12</td>
<td>2.2</td>
<td>1.43</td>
</tr>
<tr>
<td>VOC</td>
<td>0.9</td>
<td>0.4</td>
<td>14.4</td>
<td>0.6</td>
<td>24.3*</td>
<td>23.6*</td>
</tr>
<tr>
<td>CO</td>
<td>17</td>
<td>1.6</td>
<td>12.6</td>
<td>2.3</td>
<td>23.4</td>
<td>17.3</td>
</tr>
<tr>
<td>NOₓ</td>
<td>27.9</td>
<td>14.4</td>
<td>22.9</td>
<td>1.2</td>
<td>66.3</td>
<td>46.4</td>
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<tr>
<td>PM-10/PM-2.5</td>
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<td>0.1</td>
<td>13.1</td>
<td>10.8</td>
</tr>
<tr>
<td>SO₂</td>
<td>0.5</td>
<td>0.4</td>
<td>0.23</td>
<td>0.003</td>
<td>1.1</td>
<td>0.83</td>
</tr>
<tr>
<td>GHG</td>
<td>35,626</td>
<td>30,779</td>
<td>24,439</td>
<td>277</td>
<td>96,683**</td>
<td>72,546**</td>
</tr>
</tbody>
</table>

Note: 8760 hours/year operation for each, except the standby generator at 500 hours/year.

* includes 8.0 tons/year for fugitive emissions

** includes 5,512 tons/year for fugitive methane emissions
As clearly illustrated above, significant reductions in both hazardous pollutants and greenhouse gas emission are possible in this configuration. Nonetheless, FERC staff failed to respond to or even acknowledge this alternative in its Environmental Assessment.

Alternatively, if two turbines are necessary, we commented that emissions could be reduced by replacing the existing Taurus 60 turbine with the more efficient and less polluting Centaur 50L (with oxidation catalyst). This is unlikely to affect performance since the Centaur 50L turbine has only slightly less horsepower than the Taurus 60, and operating two Centaur 50L turbines in tandem would still produce 12,786 horsepower of compression (which exceeds the horsepower of a single Taurus 70). In addition to reducing hazardous pollutants, this would cut greenhouse gas emissions by about 7%, as illustrated below.

Again, this practical alternative discussed in comments by Otsego 2000 has been ignored by FERC in its Environmental Assessment.

**Effect of Replacing Taurus 60 Turbine with a Second Centaur 50L Turbine**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Taurus 60 7410HP</th>
<th>Centaur 50L 6393HP</th>
<th>2 x Cat G3608 2370HP each</th>
<th>Cat G3516 standby gen</th>
<th>Total</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(tons/year)</td>
<td>(tons/year)</td>
<td>(tons/year)</td>
<td>(tons/year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>0.86</td>
<td>0.07</td>
<td>0.07</td>
<td>1.2</td>
<td>2.2</td>
<td>1.46</td>
</tr>
<tr>
<td>VOC</td>
<td>0.9</td>
<td>0.4</td>
<td>0.4</td>
<td>14.4</td>
<td>0.6</td>
<td>24.3*</td>
</tr>
<tr>
<td>CO</td>
<td>47</td>
<td>1.6</td>
<td>1.6</td>
<td>12.6</td>
<td>2.3</td>
<td>33.4</td>
</tr>
<tr>
<td>NOx</td>
<td>27.9</td>
<td>14.4</td>
<td>14.4</td>
<td>22.9</td>
<td>1.2</td>
<td>66.3</td>
</tr>
<tr>
<td>PM-10/PM-2.5</td>
<td>4.6</td>
<td>3.9</td>
<td>3.9</td>
<td>4.6</td>
<td>0.1</td>
<td>13.1</td>
</tr>
<tr>
<td>SO2</td>
<td>0.5</td>
<td>0.4</td>
<td>0.4</td>
<td>0.23</td>
<td>0.003</td>
<td>1.1</td>
</tr>
<tr>
<td>GHG</td>
<td>35,626</td>
<td>30,779</td>
<td>30,779</td>
<td>24,439</td>
<td>277</td>
<td>96,683**</td>
</tr>
</tbody>
</table>

Note: 8760 hours/year operation for each, except the standby generator at 500 hours/year.
* includes 8.0 tons/year for fugitive emissions
** includes 5,512 tons/year for fugitive methane emissions
C. Installation of Cost-effective Vapor Recovery Technology

Fugitive emissions, meaning the leakage of unburned methane and other hydrocarbons, have been a focus of concern by Otsego 2000 in all of our comments. This is particularly an issue at Brookman Corners because of Caterpillar G3608 reciprocating compressors which are proposed to transfer gas to the Iroquois pipeline.

As discussed in our January 13 and April 15, 2015 comments on the project, reciprocating compressors are problematic due to multiple seals and rod-packing associated with pistons and cylinders that comprise the combustion engine and compressor of a reciprocating system. In fact, the EPA estimates that fugitive emissions from reciprocating compressors accounts for 24% to 29% of total emissions from reciprocating compressors, compared to less than 5% for centrifugal turbine compressors. (See our April 15, 2015 comments.) Furthermore unlike combustion emissions that are propelled from the exhaust stacks at a compressor station, fugitive emissions are released at low velocity from building vents closer to the ground. As such they can play a disproportionately higher role in the public exposure to pollutants. In the presence of sunlight, fugitive releases of methane can also convert to formaldehyde, which may threaten nearby residents with even higher levels of exposure to this known carcinogen. VOCs combined with nitrogen oxides can also create ground-level ozone, which is responsible for irritation of the eyes, nose, and lungs.

As discussed in previous comments by Otsego 2000, several techniques are available to recapture fugitive emissions. However, we chose to highlight one offered by REM Technology (www.remtechnology.com) which is both cost effective and fuel saving. Ideal for reciprocating engines, the SlipStream® system developed by REM Technology is a vapor recovery process that manifolds fugitive emissions together and reroutes them under controlled conditions back to the air intake of the compressor’s engine where they are combusted—roughly analogous to positive crankcase ventilation which is required on all automobiles today. Unlike a typical Vapor Recovery Unit that injects fugitives back into the pipeline, the method developed by REM Technology requires no additional compression, so is very affordable. Stray emissions normally vented from other places in a compressor station can be recaptured as well.

As discussed in a 2014 white paper by the EPA Office of Air Quality Planning and Standards titled Oil and Natural Gas Sector Compressors, REM Tech reports that its vapor recovery system can result in the elimination of over 99% of VOC and methane emissions that would otherwise be released to the atmosphere from compressor rod packing. Moreover, since recaptured emissions are combusted, hydrocarbons that would otherwise be lost become part of the fuel stream, thereby helping to generate power and allowing the compressor station to operate more efficiently without waste. This fuel-saving aspect of the SlipStream system allows the technology to pay for itself within a very short amount of time. Based on Dominion’s estimate of projected fugitive emissions projected at Brookman Corners, and assuming that fugitive emissions from all equipment at the site can be collected, up to 8 tons of VOCs could be recaptured and over

2 http://www.epa.gov/airquality/oilandgas/pdfs/20140415compressors.pdf
5,500 tons of greenhouse gas emissions (measured in carbon dioxide equivalents) saved annually. More information on SlipStream can be found at: http://www.epa.gov/gasstar/documents/workshops/2012-annual-conf/nasser.pdf

Although the inspection and replacement of rod-packing in a reciprocating engine and compressor is important, leakage still occurs between inspections, and ongoing maintenance is difficult to enforce. Furthermore, even newly-installed equipment produces fugitive emissions, especially reciprocating compressors that are inherently leaky. Thus there is no substitute for vapor recovery and no reason not to install a system like Slipstream at Brookman Corners.

The environmental, public health, cost, and fuel-saving benefits of vapor recovery are numerous. It is disappointing that the Environmental Assessment prepared by FERC staff makes no mention of vapor recovery, nor does it respond our comments on the subject.

D. Electric Compressors and Other Improvements Not Considered

As discussed in our January 13, April 15, 2015, and July 7, 2015 comments, another method of substantially reducing combustion emissions from the Brookman Corners compressor station would be to replace one of more of the proposed gas-fired units with electric-drive compressors.

Compact electric compressors intended for in-line pipeline applications are readily available with sufficient horsepower to substitute for the Taurus 60 and Centaur 50L turbine compressors proposed by Dominion. It is also possible to use electric compressors in applications where reciprocating engine/compressors have been traditionally applied. In fact, the EPA Natural Gas STAR PRO Fact Sheet Number 103 titled “Install Electric Compressors” describes an application in which one operator replaced five reciprocating compressors (two 2650 horsepower, two 4684 horsepower, and one 893 horsepower compressor) with four 1750 horsepower electric-drive compressors for an estimated annual fuel savings of 1,700,000 Mcf of natural gas. (http://www.epa.gov/gasstar/documents/installelectriccompressors.pdf) This is similar to the situation at Brookman Corners where two 2370 horsepower, highly-polluting Caterpillar G3608 reciprocating compressors are proposed. Replacing these with a set of electric-drive compressors would be a major improvement.

In its Environmental Assessment, FERC staff acknowledges that public comments were submitted suggesting that electric compressors be installed specifically at the Horseheads and Sheds facilities, but conspicuously fails to mention that the same recommendations were made by Otsego 2000 and others with respect to Brookman Corners.
“Several commenters also suggested that we consider the alternative of installing electric motor-driven compressors in lieu of gas-powered units at the proposed Horseheads and Sheds Compressor Stations. The potential advantages of using electric-motor-driven compressors include: (1) no production of emissions, including fossil fuel combustion emissions, at the site of operation, and (2) equal or lesser noise contributions at nearby NSAs. The proposed Horseheads and Sheds Compressor Station sites do not have adequate power for electric-motor driven compressors. DTI has stated that each site would require approximately 10,000 kW of electricity to power the compressor units and other station facilities. Doing so would require miles of additional electric transmission lines to bring in the necessary three-phase power required for the Project…. While use of electric motors may be viable alternative capable of meeting the Project’s stated purpose and need, we do not find that additional environmental benefits gained from construction of an electric unit outweigh the potential impacts from the construction of a new power line to serve an electric unit.” (New Market Project EA, page 110)

In its response, FERC staff eliminates the use of electric compressors as a viable alternative because adequate high-voltage electric power lines are not available at either the Horseheads or Sheds sites. However, as explained in comments by Otsego 2000, ample electricity is available at Brookman Corners since large 230 KV electrical transmission power-lines (soon to be upgraded to larger 345 KV lines) are co-located with the Dominion pipeline and pass directly overhead of the property. This is more than adequate to power electric compressors at the site. Furthermore, since the compressor station at Brookman Corners occupies a small portion of Dominion’s 50 acre parcel, there would be plenty of room to locate a substation on the site. These circumstances unique to the Brookman Corners compressor station are completely ignored in the Environmental Assessment prepared by staff.

In its response, staff also refers to statements by Dominion about reliability if electricity is lost, but fails to offer any substantiation for them. The flow of gas within Dominion’s main line would not abruptly stop if compression is temporarily interrupted by the loss of electricity. Furthermore, the amount of gas transferred from Dominion’s pipeline to Iroquois is a small component of the total flow in the Iroquois line. Electric-driven compressors are as reliable as gas-fired ones and are used at many compressor stations today, so this is an erroneous concern. FERC staff also concludes that electric compressors would “not necessarily” result in a benefit to regional air quality since additional power generated by the burning of fossil fuels could occur at the generation source. However this dismisses non-combustion generators that supply electricity in the region, including nuclear, hydropower, and renewables, as well as efficiencies of scale associated with energy generation at a power plant instead of from multiple combustion sources.
Other emission-reducing methods suggested by Otsego 2000 included the use of “zero-emission” dehydrators at the nearby metering station on Brookmans Corners Road and the relocation of off-site shutoff valves closer to the compressor station to reduce the loss of gas in the event of an accidental or emergency blowdown. These comments were also ignored in the Environmental Assessment prepared by FERC staff.

2. Pipeline Integrity and Safety Issues Ignored

Otsego 2000 comments extensively in its December 3, 2014 scoping comments on the need for a detailed evaluation of pipeline integrity to ensure that Dominion’s 50-year old network can safely accommodate the addition stress associated with carrying an additional 112,000 Dekatherms/day of gas. It is not apparent from the Environmental Assessment prepared by staff that this has occurred.

Dominion and FERC staff have said that the previously established maximum allowable operating pressure (“MAOP”) of the pipeline will not be increased. However in our comments, we explain that this alone is not sufficient to conclude that the additional stress of operating the pipeline closer to that previously set value is not without risk. We also emphasized that a thorough inspection of the pipeline along the entire corridor should be performed to determine if the previous established MAOP is still appropriate or should potentially be reduced, considering present conditions. It is very possible that over time, corrosion has occurred or that older welding practices (for example inferior low-frequency resistance welds) have compromised the pipeline’s integrity. Increasing carrying capacity under these circumstances could lead to catastrophe.

Similarly, we commented on the need to consider safety impacts associated with reversing flow of the Iroquois Pipeline, which has been proposed as part of the Iroquois South-to-North (“SoNo”) project. We also referenced an advisory bulletin issued by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) titled “Guidance for Pipeline Flow Reversals, Product Changes and Conversion to Service” (Billing Code 4910-60-W, Docket No. PHMSA-2014-0040)3 that specifically cautions against flow reversal and other modifications to pipeline usage without thorough evaluation.

Disturbingly, the Environmental Assessment prepared by FERC staff does not address any of these issues, and appears to simply accept at face value claims of the applicant regarding operating pressure and safety. Instead of calling upon Dominion to perform the thorough evaluation that we requested, the Environmental Assessment prepared by staff simply includes a general discussion of federal standards on pipeline safety. (See Environmental Assessment, Section 10 “Reliability and Safety,” pages 96-102.) This is followed by a general commentary that seems to be intended to make the broad argument that pipelines are safe relative to other dangers to which the public is exposed. This is clearly non-responsive to the particular concerns that

we identified and irrelevant to the purpose of the Environmental Assessment, which is to specifically evaluate the safety issues associated with Dominion’s “New Market Project.”

We are also puzzled that staff seems to believe that 1237 “significant incidents” resulting in death, hospitalization, or damage to property in excess of $115,000 is low. (See EA, page 100 including footnote). This corresponds to more than one significant incident every six days. The Environmental Assessment mentions cathodic protection which has been required since 1971, however parts of Dominion’s pipeline are older than this and no information is provided in the document as to whether cathodic protection is used throughout the corridor or not.

Relating to safety, our December 3, 2014 comments also discussed the lack of emergency preparedness among volunteer local responders to handle a serious accident at Brookman Corners. These concerns are ignored in the Environmental Assessment too.

3. Public Health Impacts Not Adequately Assessed

As discussed in our December 3, 2015 comments to FERC, it is well documented that compressor station emissions have caused significant acute and chronic health problems for people living or working near them. Health impacts of exposure to volatile organic compounds, nitrogen oxide, carbon monoxide, formaldehyde, ground-level ozone, particulate matter and other hazardous air pollutants include, but are not limited to, cardiovascular, respiratory and neurological damage; birth defects; cancer; leukemia; infertility; burning of lungs, eyes, and throat; muscle pain; mental impairment, headaches, and a host of other ailments. These impacts are discussed at length in a report by Thimble Creek Research, prepared for the Madison County Department of Health and submitted in this proceeding.

Moreover, a growing body of research shows that federal air quality regulations pertaining to gas development, and the method by which permits are granted, do not sufficiently protect public health. For example, a recent report published in the journal *Environmental Health* found that 38% of gas infrastructure sites, including compressor stations and gas production sites, generate concentrations of volatile compounds that greatly exceed health-based risk levels.


In our scoping comments, we recommended that a comprehensive health impact assessment be performed to evaluate the potential negative effects, short and long-term, to people and animals living near and at various distances from each of the proposed compressor stations, including specifically Brookman Corners. We recommended that this should include a thorough review of records and reports on the health impacts of compressor and pipeline emissions, as well as the projected costs of health care, lost wages, and human suffering.

Instead of doing this, FERC staff prepared a report titled “Human Health Risk Assessment and Responses to Comments” (EA, Appendix B) which seemingly tries to allay public concerns with models showing that harm will not occur or that the risk to human health is small. The flaw in this is that it dismisses real-world data that has been collected in the field, such as the following which corresponds to actual emissions at various compressor station facilities.

**Figure 5**
Formaldehyde Levels Near Gas Pipeline Compressors that Exceed Health-Based Standards

[Graph showing formaldehyde levels near compressor stations exceeding health-based standards]

**Source:** Warning Signs - Toxic Air Pollution Identified at Oil and Gas Development Sites - Results from Community Air Monitoring Reveal Chemicals Linked to Health Hazards, Coming Clean and Global Community Monitor, October 2014, Figure 5.
Each of the above compressor stations are facilities that received requisite federal and state approvals. Nonetheless, in practice emission levels greatly exceeded safe health standards. It is not convincing to relying on models that are ultimately inconsistent with reality. Clearly there are emission events or sources that the modeling performed by FERC fail to capture. For example, the report concludes that the impact of full station ESD blowdowns would occur only for “a short duration every five years and would not pose any discomfort, irritation, or mild health effects.” Yet emergency or maintenance blowdowns are known to occur much more frequently than this as unscheduled, and sometimes unreported events. As described in the Environmental Assessment (EA, page 87), the goal of the blowdown model was only to determine the potential short-term (1-hour acute) from an “infrequent” full station blowdown. Longer term effects of exposure to more frequent blowdowns were not considered. Likewise the conclusion that odors are essentially only a concern during blowdowns and at the property line boundary is inconsistent with the observation of many who live near compressor stations. Rather than purely relying on modeled results, FERC should support research to determine why events in the field are worse than what its models predict. Also not captured in FERC’s modeling is improper practices, such as intentional venting at night. A realistic consideration of risk must consider the possibility of such activities.

Assumption for FERC’s dispersion modeling also appear to be flawed. For example, FERC staff asserts that concerns from commenters about inadequate stack height are unfounded because those stacks are taller than nearby structures. (EA, page 86) However, at Brookman Corners the compressor station is located at the base of a valley, such that exhaust stack is actually lower than many nearby structures, and is in fact much lower than land nearby on the north side of Route 80. Dispersion is a legitimate concern at this site. As discussed by Otsego 2000, reciprocating engines are also less effective at propelling exhaust into the atmosphere, especially when operating at reduced load conditions. Since the reciprocating compressors proposed at Brookman Corners must be adjustable to accommodate variable differences in pressure between the two pipelines, this means that those engines will probably only rarely operate at full efficiency. Another factor not fully considered is the propensity for reciprocating engines and compressors to leak much more over time. Even one very leaky seal or rod-packing can dramatically worsen fugitive emissions.

Finally we are perplexed by FERC’s comparison of compressor station emissions to “everyday” combustion sources. See Appendix B, Tables 16 and 17. The concept of the compressor station at Brookman Corners producing the equivalent NOx emissions of 7260 cars concentrated onto a 50 acre property with their engines running is not appealing. Nor is the concept of 15,250 home oil furnaces for carbon monoxide, 102,857 trucks for particulate matter, or even 171 wood stoves for formaldehyde. In our view, Table 17 in Appendix B makes a very compelling argument that better emission controls are needed.
4. **Segmentation of Related Projects and Cumulative Impacts Not Considered**

As discussed in our December 3, 2015 scoping comments, FERC must avoid the segmentation of related projects. See *Delaware Riverkeeper et al. v. FERC et al.* (DC Cir. Docket Number 1496336, June 6, 2014).

According to Dominion’s application to FERC, the purpose of its “New Market Project” is transfer an additional 30,000 Dekatherms/day of gas to customers attached to destinations on its main line, and 82,000 Dekatherms/day through the Iroquois Pipeline to markets in New York and New England. However Iroquois Gas Transmission System (now majority owned by Dominion) has pursued open season bidding for its “South-to-North” (“SoNo”) project, which would reverse the flow of the Iroquois pipeline and export gas out of the United States to Canada. Similarly, on the same day that Dominion filed its application for the “New Market Project, it filed another application for the Clarington project involving pipeline upgrades and new compressor stations in West Virginia and Ohio in order to increase the supply of gas into its pipeline network. See comments filed in this proceeding by the Allegheny Defense Project, October 22, 2014.

In prior scoping comments, we assert that it is improper segmentation for FERC to review these inter-related projects independently, and that they must instead be considered together through a single comprehensive EIS. This issue is completely ignored in the Environmental Assessment prepared by FERC staff.

With respect to the cumulative impacts, our comments to FERC emphasized the need to consider all “upstream” and “downstream” impacts associated with Dominion’s projects. In the “upstream” direction this includes the extent to which the project promotes increased gas extraction and hydraulic fracturing which in turn requires additional gas well pad, drilling rigs, gathering lines, processing plants and other activities related to extraction. In the “downstream” direction, this includes the extent to which the project induces the development of additional infrastructure and facilities associated with increased dependency on gas, such as power plants, storage facilities, and distribution networks. Accordingly we stated that a comprehensive assessment of safety, health, environmental, and climate impacts associated with these activities should be performed.

No such analysis was included in the Environmental Assessment. Instead FERC staff identified a geographically limited and arbitrary set of projects in the “downstream” direction, including only one pipeline (a seven mile lateral in from the Borger compressor station in Tompkins County) and seven other potential commercial users of gas. This was then further reduced by limited “regions of influence” such that only air pollutants were considered for those seven commercial gas users. Interestingly, the Environmental Assessment also erroneously credits the Dominion project with somehow causing a gas turbine at Compressor Station 245 on the Tennessee Gas Pipeline to be replaced. With respect to wildlife impacts, only temporary construction impacts are considered; the permanent cumulative impacts of emissions, noise, and light from facilities, particularly Brookman Corners, are ignored. Stating that no “standard methodology” existing, no cumulative analysis of climate change impacts were provided at all.
Further, FERC staff dismisses out of hand any consideration of impacts associated with the increased gas drilling, stating that it is not within the scope of the Environmental Assessment and that gas drilling is outside of the “region of influence.” We strongly reject this assertion. Clearly the transport of additional gas in Dominion’s pipeline requires additional extraction at the source, regardless of how far away that is.

The Environmental Assessment also incorrectly claims that the nearest land eligible for natural gas drilling is “at least 20 miles south of the Project area.” This may be true for high volume hydraulic fracturing (using 300,000 or more gallons of water) which has been prohibited in New York State. However it is not true for conventional gas drilling and hydraulic fracturing with less than 300,000 gallons of water, which is still allowed and is occurring in the state.

5. Climate Change Impacts Ignored

In our December 3, 2014 comments, we called for a comprehensive inventory of greenhouse gas emissions for the project and a lifecycle analysis of greenhouse gas emissions (including leakage) associated with the additional transport of 112,000 Dekatherms of gas per day. This would include greenhouse gas emissions associated with the extraction, transport, distribution, and use of gas within the pipeline. No such analysis was performed.

Significantly, 112,000 Dekatherms corresponds to about 2500 tons of methane. When combusted, this amount of gas flowing in Dominion’s pipeline will produce roughly 6875 tons of carbon dioxide every day.

We are also troubled by the misleading response provided to public concerns regarding the use of “fracked gas.” The Environmental Assessment states “Once out of the ground, conventional and unconventional natural gas are subject to the same processing, transport and end-use, as well as have indistinguishable atmospheric impacts after production.” (EA, page 31) However this dismisses the climate impacts of production which are demonstrably much greater for gas produced by fracking compared to gas extracted by conventional methods. Howarth estimates methane leakage from shale gas produced from fracking to be within a range of 3.6% and 7.9%, and methane leakage from conventional gas to be within a range of 1.7% to 6%. This is a significant difference.

Assuming an average methane leakage rate of 5% for natural gas systems and using a global warming potential of 86 for methane (recognized by the Inter-governmental Panel on Climate Change over a 20 year timeframe), this corresponds to about 10,750 tons of carbon dioxide equivalents (CO2e) lost to the atmosphere every day from the flow of 112,000 Dekatherms of gas. That is about 150% more than the impact of combustion. Adding this to 6875 tons of carbon dioxide from combustion yields 17,625 tons of CO2e

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produced every day as the result of Dominion’s “New Market Project.”

A significant and persistent flaw in FERC’s analysis of energy is that it dismisses the catastrophic impacts of climate change, dismissing out of hand the potential for renewables, as staff does in this Environmental Assessment (EA, page 109).

6. **Impact on Historic Sites and Agricultural Lands Ignored**

The Environmental Assessment prepared by FERC staff ignores critical information regarding historic sites and agricultural lands.

In our December 3, 2014 scoping comments to FERC, Otsego 2000 mentioned that the Brookman Corners compressor station is located directly adjacent to a registered historic site with which it shares a property line. Information regarding this historic site, known as Slate Creek Farms, has also been submitted to FERC by its current owners, John and Maryann Valentine. As document in state and national records, Slate Creek Farm was established in 1834 on Otsquago Creek by John Smith, an immigrant from Germany. The entire 200 acre property, including the farm, adjacent residence and outbuildings, has been listed on the New York State Registry of Historic Places (11NR06276) since October 19, 2011. Slate Creek Farm has also been listed on the National Register of Historic Places (20120131) since January 31, 2012. A historic marker commemorating the site, placed by the Heritage and Genealogical Society of Montgomery County, is visible on Route 80 in front of the property. **The fact that this historic site, which shares a property line with Dominion’s project is not addressed in the Environmental Assessment by FERC is a major error.**

Brookman Corners is also located in the Erie Canalway National Heritage Corridor and near numerous nationally and state recognized historic sites such as the Holy Trinity Monastery, the Fort Plain Historic District, the Cherry Valley Historic District, and the Cooperstown and Glimmerglass Historic Districts.

As discussed in our scoping comments, many property owners in the vicinity of Brookman Corners are farmers that rely on clean air, water, and soil for their livelihood and care about the quality of food they produce. This includes a vibrant Amish community that is inextricably connected to the land they cultivate, as well as landowners, including right next to the Brookman Corners compressor station, who have certified organic farm operations that are threatened by the project. Expansion of the compressor station at Brookman Corners constitutes an industrial activity that is inherently incompatible with adjacent and surrounding historic sites and agricultural lands. The only way of mitigating that incompatibility is by reducing air, noise, and light pollution from the facility.

Significantly, the Brookman Corners compressor station is located in an Agriculture District and subject to local zoning laws which allow public utility stations only by special permit. It is therefore necessary and appropriate for conditions to be attached as a condition upon site plan approval to mitigate those impacts.
7. Water Resource Issues Ignored

Otsego 2000 submitted extensive comments on water resource issues, particularly relating to the Brookman Corners compressor station property which is located adjacent to Otsquago Creek and contains a wetland that is hydrologically connected to the creek. These were provided in our December 3, 2014 scoping comments to FERC and in subsequent comments dated April 15, 2015, which included reference comments to the New York State Department of Conservation. In particular, we noted that Dominion’s application failed to identify the existence of Otsquago Creek—a Class C trout stream—in its application.

The fact that the wetland on Dominion’s property at Brookman Corners is not isolated, but instead hydrologically connected to Otsquago Creek is significant. However, nowhere is this mentioned in the wetland report prepared by the environmental consultant hired by Dominion, Tetra Tech. During warm weather, flowing water from this wetland into Otsquago Creek is readily visible. However Tetra Tech performed its wetland survey during the month of March with snow on the ground.

As discussed in our comments, Otsego 2000 does not support crossing this wetland so that Dominion can access the northern pasture of its property as a staging area. This is a concern because of impacts to the wetland itself, but also because any runoff from equipment, chemicals, or other material located in this northern area would drain directly to this wetland, or to sensitive forested wetlands abutting Otsquago Creek immediately to the north and west. According to soil maps, this part of the property has a confining layer, so water retention is essentially impossible. Noise, light, and other impacts of construction should be kept out of this area very close to the creek as well. These comments have been ignored in the Environmental Assessment.

Although the focus of Otsego 2000 has been on the compressor station at Brookman Corners, we notice that the proposed Horseheads compressor station is precariously located between two tributaries of Bulkey Creek. Dominion intends to cross one of these, which is classified as a Class C trout stream. Horizontal Direction Drilling is the least harmful method of crossing, however this has not been proposed. Instead, the Environmental Assessment simply states that Dominion proposes to utilize either a dry (flume or dam-and-pump) or wet (open-cut) crossing. This is insufficient information. A wet (open-cut) crossing involves laying pipeline directly into a flowing waterway and would have the greatest adverse impact on water quality, fish, and wildlife. This should not be permitted. Horizontal Direction Drilling should be required if the project is approved.
8. Wildlife Issues and Impacts of Noise and Light Ignored

In our December 3, 2014 scoping comments to FERC, Otsego 2000 identified several bird species classified as endangered, threatened, or “of special concern” in the vicinity of the compressor station at Brookman Corners, but which were absent from Resource Report #3 in Dominion’s application. Most notably, members of the local Audubon chapter as well as residents in the area, have observed the short-eared owl, which is a New York State endangered species, during winter months. Audubon members have also observed the northern harrier, identified as a state threatened species. Both of these raptor species have been observed at Brookman Corners over several years during the Fort Plain Christmas Bird Count, as documented by the state Department of Environmental Conservation and Natural Heritage Program. In addition, the New York State Breeding Bird Atlas identifies three states threatened species--the northern harrier, upland sandpiper, and Henslow’s sparrow--in the area. According to the Atlas, the horned lark and vesper sparrow, both species “of special concern,” are also present.

Despite our comments, Table 4 of the Environmental Assessment prepared by FERC staff contains no bird species, nor are any discussed in the document.

Like people, wildlife in the vicinity of Brookman Corners will be negatively impacted by increased emissions, noise, and light from Dominion’s project. Higher levels of noise and light are likely to interfere with the nocturnal hunting behavior of raptors, and the ability for songbirds to communicate and protect their territories. Emissions from the project could also harm wildlife. Incorporating the emission reducing measures we have identified would benefit both wildlife and people.

To reduce wildlife impacts and protect “dark skies,” Otsego 2000 stated in scoping comments that full cut-off lighting should be required. However the Environmental Assessment prepared by FERC staff only mentions public comments about lighting for Horseheads and Sheds. (See pages 47.) Lighting considerations are particularly important at Brookman Corners since the compressor station there would be the most massive of the three sites. Although much of the facility is behind an embankment and not very visible from Casler Road, existing spotlights at the site are higher in elevation, and at night cast glaring light in all directions. Full-cutoff fixtures that direct light downward and LED lights, such as planned for Horseheads and Sheds, should also be utilized at Brookman Corners.

Based on analysis in the Environmental Assessment, noise from the facility at Brookman Corners would also be worse than at Dominion’s other two compressor stations, particular from the reciprocating compressors proposed. Action should be taken to reduce noise to levels comparable to the other sites. According to the Environmental Assessment, Dominion could delay a year before correcting any noise-related problems. (EZ, page 95) This timeframe should be substantially reduced.
November 19, 2015

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE, Room 1A
Washington, DC 20426

RE: CP14-497, New Market Project

Dear Secretary Bose:

The Southwest Pennsylvania Environmental Health Project (EHP) has reviewed the information presented in the Federal Energy Regulatory Commission’s (FERC) October 2015 environmental assessment (EA) for the New Market Project. Specifically, Dominion Transmission (DTI) proposes to construct and operate two new compressor stations in Chemung and Madison Counties, New York; add compression, a new meter and regulatory station, and other facilities to one existing compressor station in Montgomery County, New York; add facilities to two existing compressor stations in Tompkins and Herkimer counties, New York; and modify an existing meter station in Schenectady County, New York.

EHP has several concerns with the Environmental Assessment and the Human Health Risk Assessment.

Our comments are based in part on EHP’s experience directly assessing exposure and human health impacts in Washington County, Pennsylvania and in the assessment of health impacts and exposures at the compressor station in Minisink, New York. Further the EHP (Thimble Creek Research) evaluation of the proposed Madison County Compressor Station on behalf of the County Health Department extended EHP’s understanding of pipeline projects. EHP is the only organization addressing the Public and Human Health Hazards from development and transport of natural gas derived from shale fracturing.

1) **The Exposure Assessment cannot be substituted for an Environmental Impact Assessment**

The National Environmental Policy Act (NEPA) allows that, in cases where there is demonstrated minimal risk, an Exposure Assessment may be substituted for an Environmental Impact Assessment. Based on EHP’s four years of experience directly studying the health impacts produced by the extraction, processing and transport of natural gas, it is clear that the Exposure Assessment provided here is not adequate to address the determination, with regard to health, of “no significant Impact”. The following comments outline specific concerns related to human health and emissions from the DTI project.
The Exposure Assessment fails to meet NEPA requirements in three areas:

1) The identification and nature of the chemical exposures to human health is incomplete.
2) The discussion of human health impacts lacks structure, omits important EJ populations, and conclusions are not supported by the data shown.
3) The Human Health Risk Assessment and responses to comments has incorrect data, methodology showing inappropriate comparisons, and fails to address the comments from the public and local agencies.

2) Human Health Risk Assessment does not consider the full range of emissions and exposures that will occur.

a. The definition and characterization of the chemical exposures is incomplete:

Acute and chronic health risk is based on modeled exposure estimates listed in sections 4 and 5 of the Risk Assessment. This is in turn based on logic in sections 2 and 3. Discussion on pages 3 to 5 in the Human Health Risk Assessment and Table 2 list average percent by weight for eight chemicals measured at four New York compressor sites. The interstation averages vary by as much as 50%.

The Assessment goes on to omit other compounds for consideration based on the following logic (page 6). “While we acknowledge that HAP concentrations may have been documented in communities in close proximity to natural gas production areas, … production areas in general, are not comparable to transmission pipeline compressor stations.” Instead of listing the components of the transported gas, it is concluded that the gas is “Pipeline Quality,” which simply means the gas is consistent with the individual’s pipeline tariff and processed to ensure that hydrocarbons and contaminants are within acceptable limits for safe and efficient operation of the pipeline.”

There needs to be an explanation for this logic, which fails to consider the components in the gas that is vented and used to power the compressor equipment. Specifically it is necessary to define the constituents, quality and source of pipeline natural gas which is then used to model the emissions leading to the comparisons in sections 4 and 5, Tables 7 to 11.

Further, the Assessment omits a range of VOCs, saying, “VOCs are limited to butane, propane, pentane, and hexane in the case of transmission-quality gas in the pipeline.” In one case, EPA’s definition is cited for exclusion of VOCs determined to have negligible photochemical activity. There are more serious omissions cited. In the modeling on page 7 section 3.0 (Human Risk Model from Normal Operations), potential natural gas combustion by-product emissions and fugitive emissions were evaluated for acute (1-hour) and chronic (long-term) exposure, while potential natural gas emissions as a result of blowdowns and venting were evaluated for acute (1-hour) exposures only.

What is the justification for excluding venting from the long term exposure modeled concentrations? Instead, blowdowns and venting are evaluated only for the acute (1 hour
exposures) in section 5. Venting a continuous process at both compressors and metering stations near residents.

b. Risk comparison tables are incomplete and based on flawed application of EPA guidance.

A complete explanation of what is represented in the modeled air concentrations in each of the acute and chronic risk tables is needed. Section 4 Quantitative Risk Characterization contains a series of tables -- 7 thru 11 -- showing Modeled Air Concentrations. What exactly is the basis for the model estimates? Why is venting excluded? Are the chemical concentrations in the tables based on AP 42 data, or the actual averages reported in Table 2? What is the source of the fugitive data? Are the combustion emissions based on the different quality and sources of “the pipeline ready gas?”

In their current form these tables provide no guidance to assess the health hazards from the certain emissions from the pipeline, metering stations and compressors stations proposed.

Justification is needed for use of the Acute Inhalation Exposure Criteria for comparison of health risk. The following criteria cannot be used to justify the episodic exposures known to occur. They are to be used for accidental exposure determination. This is clear from bolded sections in each.

1. CalEPA Acute Reference Exposure Levels (Acute RELs) - The Acute REL is an exposure that is not likely to cause adverse effects in a human population, including sensitive subgroups, exposed to that concentration for one hour on an intermittent basis (OEHHA, 1999; OEHHA, 2015).

2. EPA Acute Exposure Guidelines (AEGL-1) – The AEGL-1 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure. (EPA, 2015c; ORI, 2015)

3. American Industrial Hygiene Association (AIHA) Emergency Response Planning Guidelines – 1 (ERPG-1) - The ERPG-1 is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined, objectionable odor (AIHA, 2014; ORI, 2015).

4. Temporary Emergency Exposure Limits (TEEL-1) – The TEEL-1 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable
discomfort, irritation, or certain asymptomatic, nonsensory effects. However, these effects are not disabling and are transient and reversible upon cessation of exposure (NOAA, 2015).

Residential exposures at the levels referred to would be intolerable if they were to occur for several hours a week or a month. The air models used are sufficient to determine the rates of exposures on a site by site basis.

These AIEC used in comparisons in the tables in section 4 substantively underestimate the human health effects that will occur in homes of nearby residents.

The tables shown are inconsistent and incomplete with, for instance, one table showing 12 compounds and another showing 34 compounds. Explain these differences – especially the limited number of compounds evaluated in tables 6, 7, 8, and 9 compared to table 10. Further describe the impact on the estimates if the frequent venting is added to the combustion and fugitive emissions estimates used.

The VOCs shown in the tables will be emitting in air mixtures with high levels of fine particulate matter. Inhaled particulate matter increases transport of the soluble VOCs into the deep lung by a factor of 10 or more. Combination of VOCs with particulates produces a primary synergistic action in air toxicity. Reference values are not determined with particulate matter in the mixtures. Therefore the URF and the RFCs under represent of the inhalation hazard in an atmosphere with high particulate matter.

The tables showing the 5 year average concentrations at or beyond the property line are applied to the cancer risk for both adults and children. The tables go on to sum the cancer risks at each location and compare them to a “Bench Mark Level”. What does that number represent and why isn’t standard methodology for cancer risk assessment used? What is the range of concentrations expected? Show the upper percentile risks.

Define exactly what is meant by a “highest predicted one hour concentration” Show how that number is calculated. Revise the tables and correct the errors in recording of highest 1-hour concentration and the 5-year average concentrations for each entry on the tables. Recalculate the risks.

c. **Wind speeds.** Show that the wind speeds used from the airport data is a valid for estimation of the hourly wind speeds for each site using local data. The wind speed is a strong determinant of the degree of stagnation of the local air system in morning and evenings. These values vary from location to location.

d. **Radon.** Hazards from radon are not limited to the radon itself but to the exposures of radon daughters the ultimate carcinogenic moiety. The radon daughters are not detected in the standard gamma counters being used to evaluate gas. The document states that the levels of radon associated with the burning of natural gas at compressor stations would be lower than at the wellhead. Additionally it is acknowledged that the effects of burning
natural gas and exposure to radon in homes, is beyond the scope of this health assessment. Radon can be entrained in natural gas. We are concerned that there are dangers posed by the gas line that the EA has not adequately addressed.

Any radon in the compressor station emissions would be vented to the atmosphere and quickly diluted by mixing with the surrounding air. But there would radon daughters bound to particulate released at the sites. FERC concludes: “Based on the analysis above, we find that the risk of exposure to radon in natural gas is not significant.” Unless the concentration of the carcinogenic radon daughters is known that statement cannot be supported.

3) Environmental Justice is dismissed
DTI omits Environmental Justice on incorrect grounds. The need for evaluation of Environmental Justice is dismissed because the locations do not have a “meaningful greater percentage of minorities than the general population, ... the projects would be sited in rural areas.” However,

*Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.*

4) Misleading comparisons. Lastly, we find that inappropriate comparisons are made in the EA. Using regional air quality standards for assessing risk close to these facilities is not helpful given intermittent and periodically high emissions which do not always disperse well when released. Nor do we think it is helpful to compare the risk associated with living near a substantial compressor station with that of exposure to wood smoke.

Conclusion

FERC’s three primary questions were:
- What would be the potential lifetime (chronic) risk from inhaling maximum property line concentrations modeled from the expected emissions from normal, maximum-capacity, operating conditions?
- What would be the potential short-term (1 hr acute) risks given a rare meteorological event that might concentrate those emissions?
- What would be the potential short-term (1 hr acute) risks from an infrequent full station blowdown (emergency or planned release of pipeline natural gas)?

After a careful read, we raise questions about the EA’s characterization of the pipeline gas itself; the emissions from combustion, venting, fugitive releases, and blowdowns (most importantly those which occur over the course of a year, but also those once every five). Additionally we have questions and concerns about the reference levels and methods of the Risk Assessment. Taken together, we think the limitations call for a more comprehensive and careful assessment of the health risks posed by the New Market Project to the residents who live near the existing and proposed compressor stations.
Please call David Brown regarding questions at 203-216-7334.

Sincerely,

David Brown, SciD

Southwest Pennsylvania Environmental Health Project
Otsego 2000, Mohawk Valley Keeper, and John and Maryann Valentine Petition for Rehearing of Order Issuing Certificate for the Dominion New Market Project and Request for Stay of Certificate

I. CONCISE STATEMENT OF ERROR

Otsego 2000 is an historic preservation and conservation organization and intervenor in this proceeding. Mohawk Valley Keeper is a community organization founded by John Valentine, and comprised of residents living in the Town of Minden and nearby communities opposed to the project. Mohawk Valley Keeper is also an intervenor in this proceeding. John and Maryann Valentine are the owners of an historic farm and home located adjacent to the project and are intervenors in this proceeding. These parties submit this petition for rehearing of the Commission’s Order Issuing Certificate for the New Market Project, 155 FERC ¶ 61,106 (April 28, 2016) (“Certificate Order”) authorizing the construction, expansion and operation of various compression and related facilities along Dominion Transmission Inc.’s existing transmission pipeline that runs between Pennsylvania and Central New York.

Although generally opposed to the entire project, these parties have targeted their objections throughout these proceeding and in this rehearing request on Dominion’s build-out at the Brookman Corners Compressor Station, in the Town of Minden, Montgomery County, New York, which will add three compressor units and other equipment totaling more than 11,000 in horsepower at the Brookman Corners site, more than doubling the capacity rating of the current 7000 horsepower facility, considerably expanding the facilities’ footprint and dramatically increasing operations at the site.
Characterized by both Dominion and the Commission as a mere upgrade, the Brookman Corners facilities expansion is more accurately described as a new construction project which will have substantial and devastating impacts on air emissions, health, noise and safety in the surrounding rural community that are equally or more significant than if Dominion had constructed a greenfield compressor station. As such, the adverse impacts of the Brookman Corners’ component should have been evaluated with similar rigor in the environmental assessment (EA) to the greenfield compressor stations at other locations along the pipeline. In addition, given that the proposed build-out is incompatible with Minden’s zoning laws and Dominion has committed to comply with the zoning process, the Commission’s certificate should be conditioned on Dominion’s completion of the siting process and should incorporate any mitigation resulting from siting review as well as commitments made by Dominion as enforceable conditions of the certificate.

These legal errors and omissions, along with the Commission’s arbitrarily constrained cumulative impacts analysis, and utterly inadequate assessment of the health and safety impacts (particularly in light of the recent Spectra explosion in Pennsylvania earlier this month) render the Commission’s order arbitrary, capricious and unsupported by substantial error and accordingly warrant rescission or, at least substantial modification of the Certificate Order on rehearing.

This rehearing petition is timely filed within thirty days of the Commission’s Certificate Order, pursuant to Section 717r(a) of the Natural Gas Act, 15 U.S.C. §717r(a) and Rule 713 of the Commission’s Rules of Practice and Procedure. The parties also
seek a stay of the Certificate Order pending resolution of this rehearing request to allow for completion of the local siting process.

II. SPECIFICATION OF ERROR

1. Did the Commission err in failing to prepare an EIS rather than an EA given the controversial nature of the project, the intensity of the impacts and the lack of compatibility with local zoning laws?

   Yes. The Section 1508.27 of the Council on Environmental Quality (CEQ) regulations, 40 C.F.R. §1508.27 identifies factors that warrant preparation of an EIS including the controversial nature of the project, its unique geographic characteristics, and the incompatibility of the project with federal, state and local laws. See 40 C.F.R. § 1508.27 (describing factors for determining whether agency must prepare an EIS). The Brookman Corners Compressor Station satisfies these criteria on its own, without even taking into account the impacts of the numerous other compressor station construction and expansion activities that are part of the New Market Project.

2. Did the Commission err in failing to make enforceable conditions of the certificate Dominion’s commitments to go through the local siting process and implement certain mitigation with respect to noise, landscaping, emissions, and lighting?

   Yes. Having represented to local officials and the public that it would go through the local siting process and New York State Environmental Quality Review Act (SEQRA), and implement certain mitigation with respect to noise, landscaping, emissions, and lighting, Dominion is bound by its promises and as such, the Commission must make them enforceable conditions of the certificate. Failing to hold Dominion and other applicants accountable for their representations to the public emboldens them to extend promises to lull the public into complacency during the comment period, only
to retract them after the certificate has been granted. The Commission’s certificate proceedings rely heavily on the applicant’s communications with the public, and failure to ensure that an applicant conveys accurate and reliable information regarding its intentions threatens the integrity of the Commission’s certificate proceedings.

3. Did the Commission err in unduly minimizing or downplaying various project impacts and thus, rejecting project alternative or reasonable mitigation because the Brookman Corners Project involves an expansion rather than a newly constructed greenfield facility?

Yes. The Commission arbitrarily disregarded certain impacts, or provided mitigation at newer greenfield sites but not at the Brookman Corners site because it involves a facilities expansion – even though the expansion adds three new compressor units and other equipment, more than doubling the horsepower rating of the entire facility.

4. Did the Commission err by arbitrarily confining the scope of its cumulative impacts analysis?

Yes. The Commission failed to take into account cumulative impacts related to air, water quality and other resources as required by NEPA.

5. Did the Commission fail to support its findings of no significant impacts with respect to health, safety?

Yes. Commission findings of fact must be supported by substantial evidence. See Natural Gas Act, 15 U.S.C. §717r(a). Here, the Commission did not adequately evaluate the project’s impacts to health and safety of the surrounding community, and therefore, its finding of lack of significant impact is unsupported by substantial evidence and should be vacated.

6. Must the Commission grant a stay of the certificate pending resolution of the rehearing request?
Yes. The Commission’s standard for a stay are met here because (1) Otsego 2000, Mohawk Valley Keeper, John and Maryann Valentine, and the Town of Minden will suffer irreparable harm if Dominion is allowed to move forward with this project in the absence of required permits, Dominion will not be prejudiced by any delay, and the interest of justice require a stay. See, e.g., National Fuel, 139 FERC ¶ 61,307 (2012) (reciting standards for a stay).

III. FACTUAL BACKGROUND

This rehearing request arises out of the Commission’s issuance of a certificate to Dominion for the construction and operation of the New Market Project. Order Granting Certificate, 155 FERC ¶61,106 (April 28, 2016) (“Certificate Order”). Based on precedent agreements executed more than three years ago following the May 2013 close of open season, the New Market Project is fully subscribed, and will supply 115,000 decatherms/day of firm transportation service for Brooklyn Union and Niagara Mohawk under the terms of 15-year precedent agreement. Certificate Order, P. 5.

Otsego 2000, an intervenor in this proceeding, is an historic preservation and conservation organization committed to a sustainable future and dedicated to finding collaborative solutions to minimize the impacts of infrastructure development. Otsego 2000 is dedicated to preserving historic, agricultural, and environmental assets in the region. Otsego 2000 has filed numerous sets of detailed comments on how the impacts
of the project could be mitigated. Yet, the Commission’s EA and its final order largely disregarded Otsego 2000’s input.

In addition to participating at the Commission, Otsego 2000 has also been involved at local and state levels to ensure Dominion’s compliance with local siting requirements, SEQRA, and state guidelines. The families who are members of Mohawk Valley Keeper and John and Maryann Valentine live in close proximity to the proposed compressor station expansion, and have been active in submitting comments to the local Planning Board. Although the Town of Minden intends to review the proposed compressor station under applicable land use laws and SEQRA (town of Minden Comments to FERC, November 19, 2015), at this point, it is unclear whether Dominion will comply.

IV. ARGUMENT

A. The Commission Erred in Failing to Prepare an EIS Rather Than an EA Given the Controversial Nature of the Project, the Intensity of the Impacts and the Lack of Compatibility with Local Zoning Laws?

Section 1508.27 of the Council on Environmental Quality (CEQ) regulations, 40 C.F.R. §1508.27 identifies factors that warrant preparation of an EIS including the controversial nature of the project, its unique geographic characteristics, and the incompatibility of the project with federal, state and local laws. See 40 C.F.R. § 1508.27B) (describing factors for determining whether agency must prepare an EIS). As relevant here, the list includes:

1 Otsego 2000 filed comments on December 3, 2014, January 13, 2015, April 15, 2015, July 6, 2015, November 18, 2015 (comments on EA) and May 26, 2016 (comments on Dominion’s implementation plan).
(3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas;

(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial;

(10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The Brookman Corners Compressor Station satisfies these criteria on its own, without even taking into account the impacts of the numerous other compressor station construction and expansion activities that are part of the New Market Project.

**Unique Characteristics**

First, the project has unique geographic characteristics. The Brookman Corners Compressor is nestled in the rural Otsquago Valley in central New York, in close proximity to prime agricultural farmland. The topography of the valley is unique in that it will limit the dispersion of emissions from the project, exacerbating the project’s adverse impacts on air quality and health. *See* Otsego EA Comments at 3. The compressor station is also located next to the Otsquago Creek, in the center of a drainage basin extending from Van Hornesevilie to the village of Fort Plain. At night, air can stabilize above cooler waters of the creek and create a temperature inversion that causes emissions to settle in the valley. *Id.*

The project’s location is unique for another reason as well: it is surrounded by a very large community of Amish and Mennonite families who subscribe to a traditional agrarian way of life, consuming food from the land immediately around them. They also have large families with young children who are particularly sensitive to environmental toxins. *Id.*
The geographic characteristics of a project are a critical factor in determining whether an EIS is required, since under NEPA, an agency must consider both the context and intensity of the proposed action in order to determine whether it will result in significant environmental impacts. See National Parks and Conservation Ass’n v. Babbitt, 241 F.3d 722, 731 (9th Cir. 2001). The geographic surroundings of a project are the “context,” while intensity refers to the severity of the impact on the surrounding locale.

Further the Brookman Corners site is located immediately adjacent to a nationally and state registered historic farm and home known as Slate Creek Farm site and is part of the National Heritage Erie Canal Corridor. This region is slated for economic development based on agriculture and historic tourism. All of these uses will be severely undermined by the expansion of industrialization at Brookman Corners.

**Project Controversy**

Second, as the parties have argued above, the project is controversial – and not because of the amount of opposition as the Commission suggests (Order at P. 36) but instead, in light of the specific effects of the project (“effect of the action”) which are in dispute. Such effects include, but are not limited to, emissions, noise, lighting, climate change, and safety. Indeed, because some of the impacts of the compressor station – such as those on health of surrounding residents or climate change are the subject of emerging research, they are precisely the types of “controversial” impacts appropriate for consideration in an EIS. C.f., Oregon Nat. Resource Council Fund v.
Finally, an EIS is required because the proposed action threatens to violate local law. *See* 18 C.F.R. §1508.27(b)(10). For example, both the Minden Town Code (adopted October 18, 2000) Section 90-30A and DEC Policy Memorandum (October 6, 2000, *revised* February 2, 2001; DEP-001) call for mitigation of noise at the property line. If noise is not mitigated at the property line, any land located between the landowner's home and compressor station is essentially sacrificed as part of a sound buffer for Dominion's project. Yet, the noise analysis adopted by the EA incorrectly focuses on noise at existing homes, which means that any resulting mitigation is inconsistent with applicable local law. In addition, the noise analysis conducted by Dominion was not conducted in accordance with standard and recommended practices, it exaggerated the ambient sound levels and failed to meet DEC Guidelines which require that noise must not be increased by more than 6 dB over ambient conditions.

Accordingly, given the unique geographic characteristics of the projects, the controversial nature of the impacts and the potential to violate local law and state guidance, the Commission erred by preparing only an EA rather than an EIS.

**B. The Commission Erred in Failing to Make Enforceable Conditions of the Certificate Dominion’s Commitments to Obtain Local Siting Approval and to Implement Certain Measures Related to Noise, Lighting, Landscaping, and Emissions.**

The Town of Minden has stated in its comments to the Commission that it reserves its right to review the Brookman Corners Compressor Station through its
siting process. Likewise, Dominion has given every indication to Town officials at various public hearings, as well as to the public that it intends to submit to local siting review. Indeed, Dominion submitted an initial Site Plan Review Application to the Town on April 30, 2015, in which it asked the Planning Board to initiate review with the understanding that a final decision would not come until after the Commission’s issuance of its order. Yet without approval from the local siting Board, Dominion submitted an Implementation Plan, seeking approval by May 25, 2016. Otsego 2000 filed objections asserting that any approval of the Implementation Plan would be premature in the absence of the Planning Board’s completion of review.

The Commission’s Certificate Order, to some extent, acknowledges Dominion’s commitment. The Order, at P. 141 states that “any local permits issued with respect to the jurisdictional facilities authorized must be consistent with the conditions of the certificate.” The order also encourages cooperation between state and local agencies, and provides that the local authorities may not unreasonably delay construction of the facilities approved by the Commission.

However, the Commission’s order is problematic in one respect: it fails to acknowledge that Dominion made certain representations in its Siting Application that both the Town and the public assumed would be followed, irrespective of the Commission’s ultimate decision. To the extent that Dominion made commitments, the Commission must treat them as binding and enforceable conditions of the certificate, rather than as subordinate to the certificate requirements.

Dominion’s commitments regarding lighting provide an illustration. Dominion made several representations about lighting in its siting application which would have
resulted in adoption of measures more protective of the community (see discussion lighting, infra). Yet, rather than bind Dominion to these representations, or await the outcome of the Planning Board (which may require these representations or others as a condition of site approval), the Commission merely “encourages” Dominion to investigate opportunities such as the one recommended by Otsego 2000 to minimize the lighting impacts for the modified Brookman Corners Compressor Station, including lighting that minimizes impacts on nighttime skies.” Certificate Order at 197.

Dominion is bound by its promises – even if offered in another forum. As a regulated entity, subject to the Commission’s jurisdiction, Dominion’s representations about the project even outside of the Commission proceeding can and should be enforceable. Failing to hold Dominion and other applicants accountable for their representations to the public emboldens them to extend promises to lull the public into complacency during the comment period, only to retract them after the certificate has been granted. The Commission’s certificate proceedings rely heavily on the applicant’s communications with the public, and failure to ensure that an applicant conveys accurate and reliable information regarding its intentions threatens the integrity of the Commission’s certificate proceedings.

There are several other examples of commitments made by Dominion to the local Planning Board and community, which must be treated a binding on Dominion. Dominion expressly stated it would comply with DEC Guidelines regarding noise increases. Dominion also stated it would use best available technology to protect the health of the public and reduce harmful emissions. Lastly, Dominion repeatedly confirmed that it will comply with local zoning, which
requires that all equipment be screened and a 20 foot buffer be installed to protect community character, property values, and viewsheds.

C. The Commission Erred in Unduly Minimizing or Downplaying Various Project Impacts and Rejecting Project Alternatives or Reasonable Mitigation Because the Brookman Corners Project Involves an Expansion Rather Than a Newly Constructed Greenfield Facility.

At various points throughout its order, the Commission arbitrarily disregards certain impacts, or provided mitigation at newer greenfield sites but not at the Brookman Corners site because it involves a facilities expansion (even though the expansion adds three new compressor units and other equipment, more than doubling the horsepower rating of the entire facility), and because the original compressor unit is not part of the new proposal. See Certificate Order at n. 197 (“The Brookman Corners Compressor Station is an existing station and requiring the modification of existing lighting would go beyond the scope of the project proposal.”).

Because the Commission effectively deemed the impacts of the original project as proverbial “water under the bridge,” it did not require additional mitigation at the Brookman Corners facility even when doing so would have brought the overall impacts in lines with new facilities. For example, the Commission refused to require Dominion to install an oxidation catalyst on the existing Taurus 60 combustion turbine at the Brookman Corners facility since NYDEC had previously approved those facilities and “neither these turbines nor the pollution control equipment associated with these turbines are part of the project.” Likewise, the Commission declined to require Dominion to adopt lighting protective of the community (see Certificate Order, P. 128 (only requiring Dominion to investigate lighting options) reasoning that
modifications to the existing Brookman Compressor station is “beyond the scope of the proposal.”

The new compressor units and other equipment proposed at the Brookman Corners Compressor station will work in coordination with the existing turbine compressor. All of the equipment, together, will be used to provide the transportation services under the precedent agreement. It is arbitrary for the Commission to allow Dominion to treat the compressor station as a single facility for operational purposes, but not for purposes of environmental review and mitigation. Moreover, while understandably, the Commission does not want to unnecessarily increase the cost of facilities (since they are passed on to ratepayers), here, because Dominion is using a property that it acquired in 2000 and already owns, there are no land acquisition costs associated with the project. Moreover, Dominion’s existing facilities were constructed fifteen years ago, and thus, those costs have likely been repaid under various contracts. In short, the proposed mitigation costs – noise mitigation, lighting restrictions, landscaping, and updated pollution controls – are minimal, but would substantially reduce the project impacts on the surrounding community.

D. The Commission Erred by Arbitrarily Confining the Scope of its Cumulative Impacts Analysis and Omitting Consideration of Certain Impacts.

Otsego 2000 comments to FERC have emphasized the need to consider all “upstream” and “downstream” impact. In the “upstream” direction, this includes the extent to which Dominion’s project promotes increased gas extraction and hydraulic fracturing additional well pads, drilling rigs, gathering lines, processing plants and other activities related to extraction. In the “downstream” direction, this includes the extent to which the project induces the development of additional infrastructure and
facilities associated with greater dependency on gas, such as power plants, storage facilities, and distribution networks. Accordingly Otsego 2000 urged FERC to perform a comprehensive assessment of safety, health, environmental, and climate impacts associated with these activities.

No such analysis was conducted. Instead, Commission staff identified a geographically limited and arbitrary set of projects in the “downstream” direction, including only one pipeline (a seven mile lateral from the Borger compressor station in Tompkins County) and seven other potential commercial users. This was then further reduced by a limited “regions of influence” such that only air pollutants were considered for those seven commercial gas users. (Strangely, the EA also erroneously credits the New Market Project with somehow causing a gas turbine at Compressor Station 245 on the Tennessee Gas Pipeline to be replaced.) With respect to wildlife impacts, only temporary construction impacts are considered. The permanent cumulative impacts of emissions, noise, and light were ignored entirely.

The Commission acknowledges in paragraph 88 that "the CEQ advises that an agency should relate the scope of its analysis to the magnitude of the environmental impacts of the proposed action." Then in paragraphs 88 through 90, FERC claims that "the geographic scope of [its] cumulative impact analysis was appropriately reflective of the magnitude of the proposed project’s direct and indirect environmental impacts." However, this is clearly not supported by fact. The magnitude of a project relates to the quantity of additional gas to be transported, which in turn relates to both the extent of drilling infrastructure to produce that gas and ultimately its
availability to end users. Thus it is illogical and inappropriate to define an arbitrarily small scope of review that fails to encompass those effects.

The Commission also improperly dismissed any consideration of impacts associated with increased gas drilling, stating that it is not within its scope of review and that gas drilling is outside of the “region of influence.” Clearly the transport of additional gas in Dominion’s pipeline requires additional extraction at the source, regardless of how far away that extraction is.

Furthermore, regardless of the distance between gas wells and Dominion’s New Market Project, the increased production of gas may not occur if facilities are unavailable to transport the increased volume of gas. In paragraphs 76, 78, an 82, FERC makes the nebulous argument that "if the project were not constructed, it is reasonable to assume that any new production spurred by such factors would reach intended markets through alternate pipelines or other modes of transportation" and that "natural gas development will likely continue with or without the New Market Project." These arguments are vague and speculative with regard to what those alternative pipelines or modes of transportation would be, the extent to which they could accommodate the additional movement of gas proposed by Dominion’s New Market Project, and whether or not such projects would be approved. Moreover, this does not void the fact that Dominion’s New Market Project would clearly facilitate
the movement of gas, and foster additional gas production.

Within paragraph 79 and 80 of its order, FERC claims that potential impacts are not "reasonably foreseeable" because information is not available regarding the specific location of gas wells that will be drilled to produce the additional gas transported in Dominion’s project. Based on this, FERC concludes that it bears no responsibility whatsoever for considering a multitude of impacts. These include systemic problems of air and water contamination, habitat fragmentation, harm to public health, and climate change. In so doing, FERC essentially assumes that these impacts will not occur, a denial of best available science. Even if the precise locations of future wells are unknown, it is reasonable and necessary for FERC to perform an estimate of potential impacts based on a reasonable review of the scientific literature. FERC’s failure to do violates its obligations under NEPA.

With respect to cumulative impacts, the Commission also repeatedly relies on the erroneous assertion that impacts are not "reasonably foreseeable" (paragraphs 83 and 85). See prior discussion of this above. Further, the EA argues that no cumulative analysis of climate change impacts is necessary because a “standard methodology” for this has not been established. Again such arguments clearly skirt the Commission’s obligations pursuant to NEPA. The Commission is required to apply the best available science to assess impacts. As with any other aspect of professional review, part of that task involves developing scientifically sound methodologies to perform those assessments.
E. **The Commission’s Findings of No Significant Impacts Are Arbitrary and Unsupported by Substantial Evidence.**

The Commission largely adopted the findings of the EA recommendations, either ignoring contrary perspectives (such as the noise expert’s opinion sponsored by Otsego 2000) or key facts that would have produced a contrary result. Commission rulings unsupported by substantial evidence will not be sustained. See *e.g.*, *Washington Gas Light v. FERC*, 532 F.3d 928 (D.C. Cir. 2010) (remanding FERC approval of LNG expansion project where substantial evidence did not support conclusion that local distribution company could address safety concerns before project’s in-service date); *see also PPL Wallingford v. FERC*, 419 F.3d 1194 (D.C. Cir. 2005) (remanding Commission order that fails to respond to opposing views proffered by intervenors).

1. **HHRA and Air Quality**

   It is well documented that compressor station emissions have caused significant acute and chronic health problems for people living or working near them. Health impacts of exposure to volatile organic compounds, nitrogen oxide, carbon monoxide, formaldehyde, ground-level ozone, particulate matter and other hazardous air pollutants include, but are not limited to, cardiovascular, respiratory and neurological damage; birth defects; cancer; leukemia; infertility; burning of lungs, eyes, and throat; muscle pain; mental impairment, headaches, and a host of other ailments. These impacts are discussed at length in a report by Thimble Creek Research, prepared for the Madison County Department of Health and submitted in
this proceeding.\footnote{\url{http://www.madisoncounty.ny.gov/sites/default/files/publicinformation/madison_county_doh_comments_-_docket_no_.cp14-497-000.pdf}} As discussed in that report, 90\% of individuals within two to three miles of compressor stations experience odors and/or health effects. Moreover, a growing body of research shows that federal air quality regulations pertaining to gas development, and the method by which permits are granted, do not sufficiently protect public health.

In prior comments, Otsego 2000 recommended that a comprehensive health impact assessment be performed to evaluate the potential negative effects, short and long-term, to people and animals living near and at various distances from each of the proposed compressor stations associated with Dominion's New Market Project. It was recommended that this should include a thorough review of records and reports on the health impacts of compressor and pipeline emissions, as well as the projected costs of health care, lost wages, and human suffering. Instead, as an appendix to its EA, FERC prepared a flawed report titled “Human Health Risk Assessment and Responses to Comments” which attempts to allay public concerns with modeling, while dismissing real-world data that has been collected in the field regarding compressor station impacts.

In comments on the EA, Otsego 2000 cited a study that documented levels of pollutants around compressor stations that far exceed federal health standards. However, in paragraph 107 of the Certificate Order, the Commission assumes such compressor stations are limited to gas production areas. Notwithstanding the Commission’s troubling response that appears to accept the exposure of communities in production areas to dangerous levels of pollution, the fact remains that such
problems are not limited to areas where gas production occurs. For example, as discussed in several comments by Otsego 2000 and others, elevated levels of hazardous pollutants have been documented, along with reports of health problems, around the Minisink compressor station in Orange County, New York.\(^3\) The Minisink compressor station is not located in a gas-production area. It is located on a transmission pipeline, just like the facilities proposed by Dominion in Sheds, Horseheads, and Brookman Corners. In fact, consisting of just two Centaur 50 turbines, its emission levels are actually much lower than the 18,000 horsepower project proposed at Brookman Corners, which consists of two turbines (one potentially lacking an oxidation catalyst) and two reciprocating compressors (which are comparable to those used in production areas). As discussed by Otsego 2000, it is not convincing to relying on models that are inconsistent with reality.

Amazingly, FERC’s order actually argues *against* the incorporation of several emission control measures that would be more protective of air quality and *against* techniques that would improve the reliability of its analysis. These are discussed below:

In paragraph 100 of the Certificate Order, FERC improperly argues that Dominion should not be required to install an oxidation catalyst on its existing Taurus 60 turbine. This is despite the fact that Dominion has told the NYS Department of Environmental Conservation and Minden Planning Board that it may

\(^3\) See letter to the NYSDEC dated December 9, 2015 from Dr. David Brown and Dr. Celia Lewis of the Southwest Pennsylvania Environmental Health Project (EHP) regarding emissions and public health impacts of the Minisink Compressor Station in Orange County, New York.
be willing to incorporate this into the project. See Discussion supra (regarding incorporation of Dominion commitments). Today an oxidation catalyst is standard equipment at compressor stations, and has in fact been incorporated into plans by Dominion for its proposed facilities in Sheds and Horseheads, as well as on new equipment at Brookman Corners. Since the Brookman Corners facility is considered a single stationary source for emissions, it is appropriate for an oxidation catalyst to be installed on the existing turbine, consistent with Best Available Control Technology (BACT) and concomitant with other changes at the site. Considering that the Brookman Corners community would be exposed to higher levels of pollutants than at Dominion’s proposed facilities in Sheds and Horseheads (even with this improvement), it is appropriate to require that an oxidation catalyst be installed to reduce impacts.

In paragraph 101 of the Certificate Order, FERC argues that using wind data from the closest weather station is sufficient for the purpose of air dispersion modeling, even if that weather station is located very far away from the subject site. Amazingly, FERC suggests that the airport in Rome, NY is an acceptable indicator of conditions at Brookman Corners, even though it is 40 miles away. In fact Dominion chose to use surface air data from Rome, NY and upper air data from Albany—two sites that are nearly 100 miles apart. Even a cursory inspection of wind roses provided in Dominion’s application to FERC reveals that they are not representative of Brookman Corners where prevailing winds travel in an easterly direction toward Ft Plain. Ignoring these concerns, FERC simply claims in its order that "each weather station is in the same climatological region as the corresponding compressor station."
This statement is devoid of meaning. In its analysis, Dominion ignores the fact that conditions at Brookman Corners are impacted by local topography including an elevated bluff north of the compressor station and the presence of a creek very close to the compressor station that can cause localized temperature inversions. In comments dated May 31, 2015 (and submitted with additional information to FERC on July 6, 2015) Bruce Eagan, an expert in dispersion modeling, recommended the placement of a weather station at Brookman Corners to gather credible wind data. The absence of credible wind data renders the air dispersion models prepared by Dominion invalid.

FERC’s EA makes several other incorrect assumptions that relate to dispersion. For example, the EA states that concerns from commenters about inadequate stack height are unfounded because those stacks are taller than nearby structures. However, at Brookman Corners the compressor station is located at the base of a valley, such that exhaust stacks will actually be lower than many nearby structures, and is in fact much lower than land nearby on the north side of Route 80. As discussed by Otsego 2000, reciprocating engines are also less effective at propelling exhaust into the atmosphere, especially when operating at reduced load conditions. Since the reciprocating compressors proposed at Brookman Corners must be adjustable to accommodate variable differences in pressure between the two pipelines, this means that those engines will probably only rarely operate at full efficiency. Another factor not fully considered is the propensity for reciprocating engines and compressors to leak much more over time. Just one very leaky seal or
rod-packing can dramatically worsen fugitive emissions. These issues are ignored in FERC's order.

In paragraph 102 of the Certificate Order, FERC states that vapor recovery systems are not needed because "the project does not include equipment to transfer or store natural gas liquids or condensates, or other types of operations on which vapor recovery systems are typically installed." This completely ignores extensive comments that have been submitted to FERC by Otsego 2000 for more than a year regarding the value of vapor recovery to capture methane and volatile organic compounds that are routinely vented from the rod-packing of reciprocating engine compressors. According to the Environmental Protection Agency, up to 29% of emissions from reciprocating engine compressors are not the product of combustion, but instead are fugitive emissions of unburned gas. Unlike combustion emissions, fugitive emissions are also vented at lower temperature and velocity near the surface, which may increase the potential for public exposure. Affordable technology exists to effectively mitigate these impact through vapor recover, and contrary to FERC, such technology is increasingly common. For example, Otsego 2000 has submitted extensive information to FERC and Dominion regarding the Slipstream system offered by REM Technology which captures and routes vented emissions back to the air intact of the reciprocating engine where they are combusted as part of the fuel stream, thereby saving fuel. Significantly, the Slipstream system has been installed at over 100 compressor stations across North America. Due to the high rate of fugitive emissions associated with reciprocating compressors and Brookman Corners' unique
topography that could trap those emissions closer to the surface, vapor recovery should be required on both reciprocating engines proposed at Brookman Corners.

In paragraph 104 of the Certificate Order, the Commission states that chronic effects of blowdowns were not considered because "full station blowdowns will likely occur no more frequently than once every five years." Yet emergency or maintenance blowdowns are known to occur much more frequently than this as unscheduled, and sometimes unreported events. As described in the EA, the goal of the blowdown model was only to determine the potential short-term (1-hour acute) from an “infrequent” full station blowdown. Longer term effects of exposure to more frequent blowdowns were not considered. Likewise the Commission’s conclusion that odors are essentially only a concern during blowdowns and at the property line boundary is inconsistent with the observation of many who live near compressor stations. Rather than purely relying on modeled results, FERC should support research to determine why events in the field are worse than what its models predict. Also not captured in the Commission’s modeling is improper practices, such as intentional venting at night. A realistic consideration of risk must consider the possibility of such activities.

Finally the Commission’s comparison of compressor station emissions to “everyday” combustion sources is perplexing. See Tables 16 and 17 of Appendix of the EA. The concept of the compressor station at Brookman Corners producing the equivalent NOx emissions of 7260 cars concentrated onto a 50 acre property with their engines running is not appealing. Nor is the concept of 15,250 home oil furnaces for carbon monoxide, 102,857 trucks for particulate matter, or even 171 wood stoves
for formaldehyde. In our view, Table 17 in Appendix B makes a very compelling argument that better emission controls are needed.

3. **Greenhouse Gases**

   In paragraph 122 of the Certificate Order, the Commission states without explanation that "neither the no-action alternative nor any system alternative was found to have a significant environmental advantage over the project while also meeting Dominion's stated purpose and need for the project." Such a statement improperly places on equal footing two issues of vastly different importance: (1) avoidance of catastrophic climate change, and (2) Dominion's desire to build its project. As confirmed in proceedings of the recent Paris accord, dramatic steps must be taken immediately by all nations of the world to rapidly reduce the consumption of fossil fuels in order to prevent a 2 degree Celsius rise in global temperature and avoid the worst impacts of climate change. Future generations and the sustainability of a livable planet are in jeopardy if such steps are not taken. This clearly outweighs the desire of one company to profit from the sale of gas to more customers. The global climate imperative requires that alternative sources of energy be pursued.

   In paragraph 123 of its order, the Commission once again asserts that it is unable to meet its statutory obligations under NEPA to evaluate environmental impacts, including the impacts of climate change. Dominion proposes to transport an additional 112,000 Dekatherms of gas per day within its pipeline, which corresponds to about 2500 additional tons of methane. When combusted, this amount of gas flowing in Dominion’s pipeline would produce roughly 6875 tons of carbon dioxide every day. However such impacts are not limited the production of carbon dioxide. 
Howarth estimates methane leakage from shale gas produced from fracking to be within a range of 3.6% and 7.9%, and methane leakage from conventional gas production to be within a range of 1.7% to 6%. Assuming an average leakage rate of 5% for natural gas systems and using a global warming potential of 86 for methane (recognized by the Inter-governmental Panel on Climate Change over a 20 year time-frame), this corresponds to about 10,750 tons of carbon dioxide equivalents (CO₂e) lost to the atmosphere every day from the flow of 112,000 Dekatherms of gas. Adding this to 6875 tons of carbon dioxide from combustion yields 17,625 tons of CO₂e produced every day as the result of Dominion’s New Market Project.

These impacts must not be ignored. Consistent with original scoping comments submitted to FERC, Otsego 2000 maintains that a comprehensive analysis of lifecycle emissions, including emissions relating to the production, processing, distribution, and consumption of gas associated with Dominion’s New Market Project, should be performed.

4. Noise

In paragraph 126 of the Certificate order, the Commission states that Otsego 2000 filed comments by a consultant who found major flaws in Dominion's noise analysis for the Brookman Corners Compressor Station. However FERC fails to respond to those detailed comments other than to simply state that it disagrees with those findings. This alone is grounds for reversal. *PPL Wallingford v. FERC*, 419 F.3d 1194, 1198 (D.C. Cir. 2005) (Reversing FERC decision, finding that its "failure to

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respond meaningfully” to objections raised by a party render[ed] its decision arbitrary and capricious.)

Industrial noises infringe on the rights of surrounding landowners and the future use of property. Excess noise, particularly at night, can also lead to serious public health problems, including insomnia, anxiety, migraines, and cardiovascular disease. The World Health Organization (WHO) has found that when outdoor night noise levels exceed 40 dBA adverse health impacts occur for vulnerable members of the population such as senior citizens, children under six and people with pre-existing conditions. At higher levels, adverse health effects are seen in even broader segments of the population. Furthermore, the WHO has issued special concerns about low-frequency noise, such as emitted by reciprocating compressors proposed at the Brookman Corners site.

Richard James of E-Coustic Solutions is an acoustical engineer with over 40 years of experience. Upon careful review of Dominion’s application, Mr. James found numerous flaws in the methodology and analysis used by Dominion’s noise consultant, Environmental Noise Control (ENC). These include the following:

- ENC’s measurements of ambient noise improperly assumed that the existing compressor runs continuously, thereby exaggerating current impacts and incorrectly suggesting that additional noise from the expansion project would be incrementally small. (By Dominion’s own admission, the compressor station currently operates only about 10% of the time.)
• ENC improperly allowed noise measurement to be contaminated by transient sounds, which inflates estimates of ambient conditions (intermittent traffic, dogs barking, etc).

• Standard acoustical protocols were ignored. For example, daytime measurements were taken for only five to ten minutes on a single day and none occurred at night. (By comparison, tests in Madison or Chemung counties occurred over a much longer period.) Measurements were also taken under windy conditions and at extremely low temperature (-12 F to -8F), which are atypical conditions and outside of the operational range of normal acoustic meters.

• ENC and Dominion incorrectly assert that 55dBA is an appropriate maximum threshold for noise based on EPA standards that were specifically developed for urban environments. Based on EPA guidelines, acceptable noise levels are much lower in a rural area. Furthermore, NYSDEC guidelines state that ambient noise should increase by no more than 6dBA, which would cause the maximum acceptable level of noise to be much lower than 55dB if proper measuring techniques had been applied.

• ENC incorrectly focused on noise at existing individual homes (Noise Sensitive Receptors). The Minden Town Code and NYSDEC Policy calls for mitigation of noise at the property line. If noise is not mitigated at the property line, any land located between the landowner's home and compressor station is essentially sacrificed as part of a sound buffer for Dominion's project. This constitutes a taking of private property rights since it deprives landowners of the ability to enjoy their own land and infringes upon the future beneficial use of that land.
• ENC failed to address the impacts of low-frequency noise, since only A-weighted noise (dBA) was considered instead of also C-weighted noise (dBC). This has the effect of underestimating low-frequency noise from the reciprocating engines that Dominion proposed to install, and which could be particularly detrimental to public health.

Sound levels in a quiet rural community such as Brookman Corners would be expected to be in the range of 35-40 dbA during the day and 25-30 dbA at night. However due to the above errors, ENC incorrectly reported levels of ambient noise that were much higher. According to E-Coustic Solutions, if ENC had properly reported ambient conditions, "measurements would have shown that the 6dBA increase is exceeded at all NSRs by as much as 22dBA." This is compounded by the fact that noise mitigation must occur at the property line and that low frequency noise components should have been considered. The only remedy for these serious flaws is for noise measurements to be repeated and analyzed by an independent noise expert, following appropriate federal and state guidelines. Protective maximum levels of noise must then be established and design changes implemented to provide adequate sound suppression. This should include, but is not limited to, sound baffles, mufflers, or silencers on every inlet and outlet to the compressor station building.

5. Lighting

In paragraph 128 of the Certificate Order, the Commission encourages Dominion to investigate ways to minimize lighting impacts at the Brookman Corners
Compressor Station, including the use of lighting to protect nighttime skies. However in a footnote, FERC states "The Brookman Corners Compressor Station is an existing station and requiring the modification of existing lighting would go beyond the scope of the project proposal." Since Dominion is requesting a major modification that significantly changes the appearance and visibility of its facility, it is necessary and appropriate for FERC to require that new and existing lighting consistently comply with requirements that are most protective of the surrounding community.

A compressor station lighting plan that is incompatible with the surrounding rural environment will adversely impact property values, ecosystems, and quality of life. Dominion's current proposal dramatically increased the number of lights at Brookman Corners, including the location of new pole lights close to sensitive wetlands. (17 pole lights are proposed in place of 4, and 18 building lights are proposed in place of 8.) Dominion has also not committed to "full-cutoff" lighting to direct lighting downward. The advantage of "full-cutoff" lighting is that it completely shields the light source from direct view at the horizontal plane to prevent intense point lighting and glare. "Dark sky" lighting certified by the International Dark Sky Association (www.darksky.org), should be required to protect wildlife and ensure that residents will still be able to see the stars at night. Particularly conspicuous lighting should also be designated for "maintenance" only and turned on only when necessary to service the site in an emergency situation.

Modern techniques exist to provide necessary security without creating an intensely lit industrial compound that intrudes upon the surrounding community.
and erodes the area’s rural character. Such features should be a requirement by the Commission.

6. Pipeline Safety

In paragraphs 132 and 133 of the Certificate Order, the Commission summarily dismisses concerned by Otsego 2000, local municipalities, and residents regarding pipeline safety. By failing to require a comprehensive Environmental Impact Statement (EIS) and failing to specify a scope of work for that EIS that includes a comprehensive inspection and technical analysis of the Dominion pipeline network prior to construction, the Commission has put people and property at risk.

If approved, this project will result in 112 million cubic feet of additional gas flowing daily through a pipeline that is over 50 years old. Adequate precautions have not been taken to ensure that the Dominion and joining Iroquois pipelines can safely accommodate this additional flow, and that the public is sufficiently protected from the dangers of leakage, rupture, fire, explosion, or other catastrophic incident. This is not only a concern at individual facilities, but along the entire Dominion corridor where residents and communities could be exposed to greater risk.

Otsego 2000 recognizes that the gas industry has certain protocols, such as the inspection of pipelines with pigging equipment every seven years. However, on April 29, 2016, a pipeline exploded in the Salem Township of Pennsylvania, destroying homes and causing a resident to receive third degree burns over half of his body. That pipeline, built in 1981, was also routinely inspected with a pig, the

last inspection having occurred in 2012. A similar tragedy could occur along the Dominion pipeline, especially if more gas flows through it as proposed. This is compounded by the fact that additional changes in land use, including residential and business development, have occurred along the pipeline corridor since its original construction.

Dominion has said that the maximum allowable operating pressure (“MAOP”) of its pipeline will not change. However, this alone is not sufficient to conclude that operating closer to that numerical limit, set years ago, is safe. Corrosion is likely to have occurred over time, and it is possible that older welding practices (for example inferior low-frequency resistance welds) have compromised the pipeline’s integrity. Furthermore, segments of Dominion’s pipeline near Brookman Corners and the new compressor stations proposed at Sheds and Horseheads will be exposed to the greatest increase in localized pressure due to additional compression. A thorough inspection and technical analysis of the entire pipeline should be required to determine what additional risks are posed by Dominion’s project, and whether the previously established MAOP is still appropriate or should be reduced.

Dangers associated with reversal of the Iroquois Pipeline, which would connect to the Dominion pipeline at the Brookman Corners site, have not been considered either. An advisory bulletin issued by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) titled “Guidance for Pipeline Flow Reversals, Product Changes and Conversion to Service” (Billing Code 4910-
specifically cautions against flow reversal and other modifications to pipeline use without thorough evaluation.

These issues and others affecting the safety of Dominion's pipeline are discussed in a letter dated May 9, 2016 to State Comptroller Thomas DiNapoli, Governor Cuomo, and agencies from 94 environmental and citizen advocacy organizations, which has also been filed with FERC.

Otsego 2000 and members of the public have additionally expressed concern about emergency preparedness, including the capacity of local volunteers that would need to respond to a serious accident at Brookman Corners. FERC should evaluate these manpower, material, and training needs, and require that Dominion provide additional manpower, equipment, or training as necessary to ensure that the public is protected.

7. Alternatives – Electric Driven Compressors

In paragraphs 115 through 119 of its order, FERC performs an incorrect analysis of emissions associated with the production of electricity that would be necessary to hypothetically operate electric-drive compressors at the Brookman Corners, Sheds, Horseheads, and Sheds compressor stations in lieu of gas-fired compressors. FERC's analysis properly determines the amount of electricity needed to operate compressors with horsepower equivalent to those at the compressor station sites, taking into account motor efficiency and line losses. However its estimate of

\[ \text{http://www.pipelinelaw.com/files/2014/09/Advisory_re_Flow_Reversals.pdf} \]
emissions do not correctly reflect pollutants associated with New York’s electricity generation portfolio.

According to the data collected by the New York State Public Service Commission in preparation of its proposed Clean Energy Standard, in 2014 approximately 26% of New York’s electricity came from renewables (mainly hydropower), approximately 31% came from nuclear power, and almost all of the remaining 43% came from fossil fuels. Furthermore, almost all of this fossil fuel contribution was electricity generated by gas-fired power plants. Only a very small portion, about 4.5%, came from coal. It is therefore apparent that the majority of New York’s electricity today (approximately 57%) is derived from very low-carbon sources (renewables and nuclear power). Thus it can be expected that the amount of greenhouse gas emissions attributable to running a compressor station with electric-drive compressors, accounting for line loss and motor efficiency, would be approximately half, of greenhouse gas emissions generated by gas-fired compressors. Likewise since coal contributes such a small portions of the state’s total electricity production, other pollutants, including SOx, can be expected to be much lower too. However the table following paragraph 118 of FERC’s order does not reflect this. Instead FERC predicts only a modest reduction in

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8 Ibid. It should also be noted that Governor Cuomo has announced that he intends to eliminate coal for electricity generation by the year 2020.
greenhouse gas emissions and predicts that SOx levels would be higher. It appears that FERC is not using the best or most current data regarding New York’s electricity mix.

In its EA, FERC states that it eliminated the use of electric compressors as a viable alternative because adequate high-voltage electric power lines are not available at either the Horseheads or Sheds sites. However, as explained in comments by Otsego 2000, ample electricity is available at Brookman Corners due to large 230 KV overhead electrical powerlines that traverse the property (These are also planned for upgrading to 345 KV.) Furthermore, since the compressor station at Brookman Corners occupies a small portion of Dominion’s 50 acre parcel, there would likely be room to locate an electrical substation on the site too.

8. Socioeconomics And Environmental Justice

In paragraph 136 of its order, FERC acknowledged that several comments expressed concern that Amish and Mennonite families living in the Brookman Corners area were unable to participate in the proceeds and that impacts upon those communities were not considered. However FERC dismisses such concerns out of hand, apparently failing to understand the unique set of limitations that members of these communities have.

Since these communities do not use electricity, they are unable to review online material filed by Dominion, FERC, or other agencies. Nor are they able to file comments electronic comments. FERC suggests that two scoping meetings provided
adequate opportunity for oral comments. However the first of these was held in a location over 40 miles away from Brookman Corners, and the second meeting (scheduled because of inadequate facilities at the first) took place in a snowstorm, also 40 miles away from Brookman Corners. The Amish and Mennonite families of Brookman Corners travel by horse and buggy, therefore neither of these locations provided reasonable access. Despite numerous requests for at least one scoping hearing in the vicinity, FERC was unresponsive to the needs of these two communities that will bear the greatest risks and burden of the proposed compressor station project at Brookman Corners. In its order, FERC suggests that adequate opportunity for participate existed because two (2) Amish landowners filed motions to intervene. The Amish community that lives in the region surrounding Brookman Corners includes hundreds of families. Such a conclusion therefore reveals a serious lack of appreciation, understanding, and respect for this unique community of people in upstate New York.

Even more importantly, FERC's order fails to address impacts of the proposed Brookman Corners compressor station project upon Amish and Mennonite residents of the area. Subscribing to traditional agrarian practices, the Amish and Mennonite of upstate New York often spend their entire lives living and working within a single area. Every breath these people take and almost every bite of food they consume
comes from the air and land immediately around them. As such, they are particularly vulnerable to airborne pollutants, as well as pollutants which may impact soil or crops (like nitrogen oxide). Furthermore, because they have large families, many of the Amish and Mennonite residents in the region surrounding Brookman Corners are children. In fact, four Amish schoolhouses are located very close to Dominion’s proposed project. It is well established that children are particularly sensitive to toxins in the environment, because of their immature and sensitive respiratory, kidney, and endocrine systems. Due to their traditional ways, many also do not receive regular modern medical services.

These facts warrant special consideration and leadership by FERC to require the best available technology to minimize public exposure to pollutants from Dominion’s project and other impacts of the facility. To date, this has not occurred. Due to the unique historic, ethnic, and economic conditions of this community, Otsego 2000 believes that the above factors constitute a bona fide Environmental Justice concern.

In paragraph 137 of its order, FERC appears to acknowledge the potential for property values to be adversely impacted surround the new compressor stations proposed in Sheds and Horseheads, yet claims that visual impacts would be reduced by proposed mitigation. However FERC fails to acknowledge any potential for loss of property value surrounding the Brookman Corners compressor station. This is an
incredulous oversight, considering the extent of Dominion’s proposed expansion project at Brookman Corners which involves a significant increase in compression, the enlargement of structures, the addition of three exhaust stacks, coolers, and other equipment, and far more extensive lighting than today.

The visual impacts of these significant changes are not mitigated by any provisions identified by Dominion in its application or by FERC in its EA. Moreover, the landscape plan that has since been proposed by Dominion fails to meet minimum requirements of the Minden Town Code for visual screening from adjacent properties. In addition, reciprocating compressors proposed at Brookman Corners threaten to introduce high levels of additional, low frequency noise that is particularly annoying to the human ear. FERC has failed to adequately consider such impacts or require their mitigation.

9. Historic Assets

In paragraph 139 of its order, FERC vaguely acknowledges the presence of Slate Creek Farm but understates its importance relative to Dominion’s project at Brookman Corners. Slate Creek Farm shares a property line with Dominion’s compressor station and is clearly visible from the site. As documented in state and national records, Slate Creek Farm was established in 1834 on Otsquago Creek by John Smith, an immigrant from Germany. The entire 200 acre property, including the
farm, adjacent residence and outbuildings, has been listed on the New York State Registry of Historic Places since October 19, 2011. Slate Creek Farm has also been listed on the National Register of Historic Places since January 31, 2012. A historic marker commemorating the site, placed by the Heritage and Genealogical Society of Montgomery County, is visible on Route 80 in front of the property. Since acquiring the property in 2003, John and Maryann Valentine have meticulously restored and improved this historic gem of Montgomery County in the hope of establishing a bed and breakfast. The parties maintain that protecting the historic value of Slate Creek Farm requires special attention to all of the previously discussed issues of emissions, landscaping, lighting, and noise. FERC has failed to provide this.

**REQUEST FOR A STAY**

The Commission reviews requests for a stay under the standard established by the Administrative Procedure Act, 5 U.S.C. §705, and will grant a stay when "justice so requires." See, e.g., National Fuel, 139 FERC ¶ 61,307 (2012)(reciting standards for a stay). In assessing a stay, the Commission considers several factors, which typically include: (1) whether the party requesting the stay will suffer irreparable injury without a stay; (2) whether issuing the stay may substantially harm other parties; and (3) whether a stay is in the public interest. The basis for a stay is fact specific and involves a balancing of all of these factors. Virginia Petroleum Jobbers v. FERC, 259 F.2d 921 (D.C. Cir. 1958)(listing factors considered in issuance of stay, including whether absence of stay will preclude future relief).
To justify a stay, a party must demonstrate the prospect of injury that “must be both certain and great; it must be actual and not theoretical. Wisconsin Gas v. FERC, 788 F.2d 669, 674 (D.C. Cir. 1985). Moreover, the injury must be irreparable; mere injuries, however substantial, in terms of money, time and energy necessarily expended in the absence of a stay are not enough. The possibility that adequate compensatory or other corrective relief will be available at a later date may defeat a claim of irreparable harm. Here, if the expansion moves forward before the local siting approval process is complete, irreparable harm will result since the Town will lose the ability to have input on siting of the compressor station.

Meanwhile, issuance of the stay will not harm Dominion. Having committed to comply with the local siting process, Dominion presumably built compliance deadlines into its timeline for coming on line. Moreover, Dominion has not yet procured the necessary air quality permits required to commence construction, and therefore, could not move forward in any event.

Finally, a stay is in the interest of justice: the project will directly harm members of Otsego 2000 and residents of the Town of Minden. For all of these reasons, the Commission should stay this proceeding pending resolution of this matter on rehearing and judicial review.

VI. CONCLUSION

WHEREFORE, for the foregoing reasons, Otsego 2000, Mohawk Valley Keeper, and John and Maryann Valentine respectfully request that the Commission GRANT this request for rehearing and stay request, and vacate or rescind the certificate
authorizing the New Market Project, or in the alternative, incorporate in the certificate the conditions proposed in this rehearing petition.

Respectfully submitted,

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May 31, 2016
My name is Geoff Marshall, I am a resident of Horseheads, New York. My wife and I have three children. I am a retired Navy Test Pilot still working in the aviation industry and our family moved here 7 years ago.

I have flown extensively in the Elmira area over the past seven years in helicopters, airplanes, and gliders. As a pilot, wind speed and direction is critical information for safe operation of any aircraft. Topography has a major and obvious impact on wind speed and direction – mountain flying is one of the most dynamic regimes a pilot can face. Winds that are present on one side of a hill may not be present on the other side, or can create a series of updrafts and subsequent downdrafts as air impacts a ridgeline or hill. The magnitude of the effect depends on the velocity of the wind, size of the hill/obstruction, and severity of the incline in the hill. This I can say with absolute certainty – knowing what the winds are on one side of the hill will not directly translate into knowledge of the winds on the other side. The topography of the Southern Tier region lends itself to variation in winds and weather. Real time data in the location of your flight is crucial to safe operation of your aircraft, whether it’s a wind sock, some smoke, waving grass, or an actual weather station.

In order to get good information, I use several different web sites, but rely extensively on NOAA aviation weather for local and regional forecasts in addition to current observations. For site specific data, Weather Underground has a site that includes registered personal weather stations (PWS). While the equipment used at these locations may be more basic in nature, wind speed and direction are not hugely complex measurements and so these local measurements, in my experience, provide useful data. Below is an example of the variance in local wind conditions taken from the Weather Underground web site – the “stem” on the circle indicates wind direction, magnitude is indicated by a “tick” mark for each 5 mph of wind:
And this from later in the same day. Note that ELM is showing 12 mph of wind while the other sites were all 5 mph or below.

The take away from this is that the winds are very different just a few miles from the Elmira in both direction and magnitude. It would be false to assume that the local weather is homogenous throughout our region. To take data from a site because it is easily available lacks rigor and defies the critical concept of “due diligence.” The action is similar to looking for car keys under a street lamp because it is lighted even though the keys were lost in a dark alley well away from the lamp.

And the data for the Veteran site is the closest of the three Dominion compressor sites currently requesting permitting. The Horseheads (Veteran) compressor model was run with surface data from the Elmira Airport – approximately 8 miles from the site - and upper air data from Buffalo, New York. https://www.dom.com/library/domcom/pdfs/gas-transmission/new-market/horseheads-air-permit-application.pdf


It would be very reasonable to expect that the winds, temperature, dew point, and other critical parameters will show variance from the data location given the distance. I can find no evidence that Dominion did any work to validate or corroborate the data chosen to the site specific weather patterns. In my industry we perform qualification by similarity for many systems, however, we ALWAYS do testing to ensure our model matches reality.

On the subject of variability from the chosen data set, I would like to discuss the temperature inversion we often experience in this area. Typically, the inversion manifests itself in a thick valley fog. This fog was actually the subject of a 1973 paper by scientist from Calspan on the persistence of valley fog (R. J. Pilié, E. J. Mack, W. C. Kocmond, C. W. Rogers, and W. J. Eadie; Calspan Corporation, Buffalo, N.Y. 14221 (1973) The Life Cycle of Valley Fog. Part I: Micrometeorological Characteristics). One of the negative outcomes of an inversion layer is that pollutants are trapped below the layer. Having spent a significant part of my life in the Los Angeles area and then several “trips” to the Persian Gulf I can attest to having first-hand knowledge of this effect. In the Persian Gulf I have observed my helicopter air temperature gage climb from ~100°F at sea level to over 110° F at 3000 feet MSL. As a result of that inversion, all the pollution from the “waste gas” burn-off from the oil wells was trapped below creating haze, a foul smell, and irritation to eyes and lungs. Los Angeles is similar in cause and effect. This inversion will not be detected using upper air data from Buffalo or Albany as it is a local weather phenomenon that will be obscured by cherry picked data. Again, the Dominion application methodology lacks rigor and does not comply with due diligence.

As I write this today (8/30/16), we are experiencing a valley fog in the Elmira area. We also had fog on Saturday, 8/27/16. Today I used my local temperature sensors to compare our location to Elmira airport. At approximately 0800 today, ELM was reporting 55°F while my sensors (two of them) were both reporting 57°F. The field elevation of ELM is report as 954 feet MSL. My house is located on a hill within site of the airport approximately 6 miles to the east and I have determined that our elevation is 1300’ through the use of topographic maps and GPS. A 2°F lapse in the positive direction with accompanying fog is a real life demonstration of a temperature inversion. Again, only local data will provide the indication of the phenomenon – this morning in Buffalo the 8AM report was for 10 miles visibility, partly cloudy, and 63°F.

Finally, as a pilot I am required to extensively plan for each flight. During planning for a flight in the US Mid-West, I noticed a line of Temporary Flight Restrictions (TFRs). While they were not on my route of flight, I was interested as they did not conform to what I usually see with TFRs – VIP movement, sporting events, significant natural disasters, etc. The flight hazard notice read:


Again, there were several of these restrictions depicted in a line that I have since discovered is a pipeline south of Indianapolis. The size of this TFR - 10,000’ MSL and 2 nm radius - is a significant inconvenience to general aviation and does beg the question of whether the notion that the compressor impacts are purely local can be trusted. I don’t know what was happening in that area, but the controlling agency apparently felt that aircraft could experience adverse
effects nearly two miles above the location. What can possibly require such a restriction and what effect will it have at ground level? For our local area, the compressor site is located near the approach corridor to runway 24 at ELM. If such a flight restriction occurs it will complicate the smooth flow of air traffic in and out of the airport or potentially the safety of aircraft operating in the vicinity of the proposed compressor.

My conclusion is that Dominion Air State Facility Permit Application for the Horseheads Compressor Station should be denied by the NY State Department of Environmental Conservation (DEC). The company has chosen data because it was available, not because it was applicable to the local area. They have not validated their model using data from the actual site location. There is no good excuse not to do the work – there are companies who perform meteorological field work who could gather and interpret the needed data. For the second quarter of 2016, Dominion financial filings showed a net income of $452,000,000 on revenue of $2,502,000,000, yet this company will not spend the money necessary to satisfy what would be considered safe, ethical, and in keeping with the concept of due diligence. And if this company is unwilling to spend a relatively small amount of money to be good neighbors and custodians of our community’s environment, in what other areas are they cutting corners?
INTRODUCTION

Egan Environmental Inc. has been asked by Otsego 2000 to review and comment on the dispersion modeling efforts associated with the proposed expansion by Dominion Transmission Inc. (DTI) of the Brookman Corners compressor station in Montgomery County, New York. As part of its “New Market Project” (CP14-497-000), DTI plans to expand the capacity of the facility by adding a Solar Centaur 50L combustion turbine, two Caterpillar G3608 reciprocating internal combustion engines, coolers, and metering/regulation equipment. This is in addition to an existing Solar Taurus 60 combustion turbine presently operating at the facility.

Otsego 2000 is concerned about the health impacts of releases of greater amounts of Hazardous Air Pollutants, and Criteria Pollutants that would be associated with the expansion project. Further, Otsego 2000 has proposed several alternatives to the design and control technologies of the project that would significantly lower the total emission rates of air contaminants and that, if implemented, would provide positive solutions to reduce their adverse health impacts. (See the April 25, 2015 cover letter by Otsego 2000 to Eric Tomasi and Kenneth Warn of the Federal Energy Regulatory Commission (FERC) and the associated March 19, 2015 comments by Otsego 2000 to Chris Hogan of the New York State Department of Environmental Conservation (NYSDEC).)

I have reviewed the Air State Facility Permit Application for the Brookman Corners Compressor Station submitted by DTI to the NYSDEC on June 2, 2014; Resource Report No. 9 Air and Noise Quality submitted by DTI as part of its application to the FERC, also dated June 2,
2014; the cover letter and comments by Otsego 2000 to FERC and NYSDEC referenced above; the report titled “OUR VALLEY,” by Dr. Steven Hudyncia, that describes the geographic and local meteorological setting of the Otsquago Valley; various sections of Subpart 231-12: Ambient Air Quality Impact Analysis – NYSDEC; meteorological data sets available from the National Weather Service; and Google Earth topographic data and images of the project and surrounding areas.

A. LOCAL TOPOGRAPHY, METEOROLOGY, AND FACILITY CONSIDERATIONS.

The Brookman Corners Compressor Station proposed for expansion is located at a base elevation of about 186 meters above sea level in a central section of the Otsquago Valley, which is the drainage basin for Otsquago Creek. Otsquago Creek passes within about two hundred feet of the site and flows to the Mohawk River in Fort Plain about 9 km to the east. The Otsquago Valley slopes gently downward from west to east for several kilometers before intersecting the Mohawk River. To the west, the terrain slopes upward for several kilometers. A ridge is to the north of the site; higher terrain is also present to the southeast of the site.

The document “OUR VALLEY” describes the topography and comments on the observations of temperature inversions at night in the valley and along the Otsquago Creek. Under low synoptic scale wind conditions, drainage winds will develop from west to east characterized by low speeds and minimal vertical mixing rates of pollutants emitted into the flow. These stable atmospheric transport conditions are often associated with observations of high ground level concentrations downwind of source areas.

Under light wind and clear sky conditions at night, the net effect of the valley topography would be to create low level drainage winds that flow down through the valley until they intersect with the Mohawk River just to the east of Fort Plain. With relatively short stack heights and low plume rises, the sidewalls of the Otsquago Valley would tend to constrain emissions from the compressor station and limit airflow, especially at night under low wind speed conditions. In the valley, these same factors will limit the dispersion of fugitive emissions vented near the ground, which may not have temperature or velocity induced plume rise to contribute buoyancy.

In situations where local flows dominate the transport of pollutants from a source area, it is especially important to use wind data in a dispersion model that is representative of conditions in the study area. For this valley, the meteorological conditions that are expected to result in the highest impact on air quality due to emissions from DTI’s compressor station and for averaging times of 1 hour and 24 hours are likely to be associated with low wind speed and stable meteorological conditions.
B. PREDICTED POLLUTANT CONCENTRATIONS FOR COMPLIANCE WITH NAAQS AND STATE GUIDELINES ARE UNCONVINCING.

There are three sets of pollutant concentrations reported by DTI that raise concerns about the accuracy of the methodology used to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS) and the Annual Guideline Concentrations (AGCs) of the NYSDEC Air Toxics Regulatory Requirements. These are discussed below.

1. Nitrogen Dioxide (NO₂)

As reported by DTI in Table 9.1-20 of Resource Report No. 9, the maximum 1-hr concentration of NO₂ is 166.1 µg/m³, which is 88% of the NAAQS standard. However the accuracy of this finding is critically dependent on both the choice of meteorological data used for modeling the facility impact and assumptions regarding the validity of background concentration data. DTI argues that recent data from Amherst should be used for a background value because a comparison of the NO₂ concentrations between Amherst and Loudonville for the years 1997-1999 shows that Amherst values were higher than Loudonville during this limited period. However Amherst is located more than 200 miles away from Brookman Corners, near Buffalo, NY. Buffalo is clearly too far away to provide a credible 1-hr background value. This calls for monitoring of 1-hr background NO₂ concentrations in an area closer to the compressor station site.

To predict the facility's NO₂ impact, DTI uses EPA's Tier 2 factor of 0.8 for NO₂/NOx to estimate a 1-hr NO₂ concentration of 87.1 µg/m³. However, the Tier 1 value of 1.0 is more appropriate in situations like this with insufficient data and where maximum impacts occur immediately downwind of the source area. If the Tier 1 value had been used, the predicted maximum impact would be 109 µg/m³ and the total with background would be 188 µg/m³ — which is not below the NAAQS threshold.

Further, as discussed below, there is no evidence that DTI identified any other NO₂ sources to add to the modeling of facility impacts. This adds to the non-conservative aspects of the modeling effort.

2. Particulate Matter (PM)

As reported by DTI in Table 9.1-20 of Resource Report No. 9, the sum of the impacts of the facility and background for PM₂.₅ is 91% of the 24-hr standard and 84% of the annual average standard using background values from Utica. However, the modeling of the facility impacts depends upon the choice of meteorological input data and assumptions about similarities of the ground surface conditions for the selected anemometer readings and conditions at the site. DTI also fails to explain why different reference locations (Utica and Rochester) are used for background concentrations of PM₂.₅ and PM₁₀. Thus, the predicted impact totals are not persuasive.
3. Formaldehyde

For formaldehyde, the compliance margin is even narrower, as shown in Table 4 of the permit application. DTI’s modeling results predict a concentration of 0.57 µg/m³ annually for formaldehyde, as compared to a 0.60 µg/m³ annual guideline concentration. Significantly, as discussed in the Air State Facility Permit Application (page 10), this is after DTI seeks to relax ambient air quality criteria based on unsupported claims that it will use Best Available Control Technology (BACT).

In summary, the closeness of predicted concentrations of NO₂, PM₂.₅, and formaldehyde to the corresponding national ambient air quality standards and state guideline concentrations for HAPs raises serious questions about compliance. DTI has relied on inadequate background data. In addition, DTI has not collected site-specific meteorological data and has not provided any indication that it intends to conduct follow-up ground truth monitoring of pollutant concentrations after emissions increase. All of these concerns undermine the robustness and reliability of DTI’s compliance demonstrations.

C. INADEQUACIES OF THE MODELING PROTOCOL.

The modeling protocol in Appendix A of the Air State Facility Permit Application is incomplete and inadequate. The information provided does not address many important details of the analysis methodology and findings that are necessary to understanding DTI’s work. Nor does it describe agreements that may have been made with the regulatory agencies involved in the review of that modeling and interpretation of data. This lack of information undermines the credibility of the modeling process.

1. Significant Impact and Monitoring Thresholds Are Ignored.

Notably, the modeling protocol does not address how the facility impacts compare to important pollutant impact and monitoring criteria established by the USEPA and NYSDEC.

Significant Impact Levels (SILs) are ambient air concentrations established by the USEPA for Criteria Pollutants. If SILs are exceeded by the source to be permitted, the applicant must identify other sources that contribute to total air quality in the area and include them in the cumulative modeling. The sum of those contributions plus the facility’s impact can then be compared to the ambient standards for compliance with NAAQS. DTI may not believe it is required to do this because it has predicted that annual emission rates for the proposed project alone are below “major source” emission thresholds that trigger Prevention of Significant Deterioration (PSD) regulations. However, DTI is still required to show compliance with the state and federal ambient air standards through modeling demonstrations.
The USEPA and the NYSDEC have also established criteria for reviewing whether preconstruction monitoring is required for new or modified sources. These are referred to as Significant Monitoring Concentrations (SMCs) by the USEPA and “de minimis monitoring levels” (DMLs) by the NYSDEC. According to Section 231-12.4 of NYSDEC regulations, the NYSDEC may exempt a facility from preconstruction monitoring if predicted impacts of the facility are less than the DML de minimis values.

The implications of this are readily seen by displaying SIL and SMC/DML criteria with DTI’s projections for NO₂ and PM from Table 9.1-20 of Resource Report No. 9. As shown in the table below, DTI substantially exceeds SIL and SMC/DML thresholds, indicating that impacts of the facility are significant.

**Comparison of NO₂ and PM Concentrations Projected by DTI to SIL and SMC (DML) Criteria**

<table>
<thead>
<tr>
<th>Pollutant/Averaging Period</th>
<th>Maximum Impact of Facility</th>
<th>Background</th>
<th>Total</th>
<th>NAAQS</th>
<th>SIL</th>
<th>SMC/DML</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO₂*/1-hr</td>
<td>87.1</td>
<td>79.0 (Amherst)</td>
<td>166.1</td>
<td>188</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>NO₂*/Annual</td>
<td>10.6</td>
<td>15.6 (Amherst)</td>
<td>26.2</td>
<td>100</td>
<td>1.0</td>
<td>14.0</td>
</tr>
<tr>
<td>PM-10/24-hr</td>
<td>14.3</td>
<td>45 (Rochester)</td>
<td>59.3</td>
<td>150</td>
<td>5.0</td>
<td>10.0</td>
</tr>
<tr>
<td>PM-2.5/24-hr</td>
<td>10.8</td>
<td>21.0 (Utica)</td>
<td>31.8</td>
<td>35</td>
<td>1.2</td>
<td>4.0</td>
</tr>
<tr>
<td>PM-2.5/Annual 2.4</td>
<td>2.4</td>
<td>7.7 (Utica)</td>
<td>10.2</td>
<td>12</td>
<td>0.3</td>
<td></td>
</tr>
</tbody>
</table>

* USEPA default value of 80% plume conversion of NOx to NO₂ is used

It should be noted that, according to Section 231-12.4, NYSDEC may also waive requirements for monitoring in situations where DML values are exceeded if “an applicant makes an acceptable showing that representative existing ambient air monitoring data exists in the affected area and is of the quality and nature which demonstrates the current conditions of the area’s air quality.” However this does not apply since no such data from the affected area has been provided.

The SMC/DML values above clearly indicate that DTI should not be exempted from preconstruction ambient air monitoring.
2. Failure to Address Ground Surface Parameters as Required by AERMOD.

Another troubling aspect of DTI’s modeling protocol involves the statement that the site area is designated as “Rural” on the basis of a 3 km radius land use analysis developed by Auer. AERMOD’s predecessor model (ISCM) used the Auer methodology to determine whether the “Rural” or the “Urban” dispersion coefficients should be used in the modeling calculations. However, the developers of AERMOD essentially abandoned the Auer land use method by calling for a determination of roughness lengths, albedo and Bowen Ratio which are used in the calculations of surface heat fluxes, wind profiles and atmospheric dispersion rates. The roughness length is a parameter that influences the mechanical turbulence mixing rate near the earth’s surface, Albedo is a parameter that quantities the fraction of the sun’s heat radiation that is reflected from a surface back to space. The Bowen Ratio parameterizes the amount of sensible heat vs. latent heat involved in heating air near the ground surface. All of these parameters enter into the calculations of surface heat flux and boundary layer wind profiles used in AERMOD. The AERSURFACE program determines these parameters from specific land cover data used in the meteorological data processor, AERMET.

The DTI Modeling Protocol for AERMOD should address how these specific ground surface parameters will be determined using AERSURFACE for this project site and how they compare with the same parameters associated with the site of the meteorological data to be used. The modeling protocol submitted by DTI fails to mention these important surface parameters.

3. Non-Representative Wind Data.

Perhaps most importantly, DTI’s modeling protocol does not support the selection of meteorological data for its modeling effort pertaining to wind speed and direction.

EPA modeling guidance calls for meteorological data to be input into AERMOD that is representative of the meteorological conditions at a proposed project site. In general, this means that the meteorological data should be reasonably close to the site and in similar terrain. It also means that there should be no intervening topographic features such as high terrain or large water bodies which would result in different wind patterns at the different locations. EPA suggests the use of AERSURFACE to compare the surface parameters at the project site with those at the recommended meteorological site.

The permit application fails to recognize the importance of using appropriate and representative meteorological input data for dispersion modeling. Section 9.1.1.1 of Resource Report No. 9 identifies national weather stations at Binghamton, Syracuse and Albany as “First Order” meteorological stations and compares the mean temperatures, the inches of rainfall, and the annual average wind speeds at these stations. Mean temperatures and rainfall are not key differentiating parameters for this dispersion modeling application. The section then presents wind roses for four airports “representative” of the project area (Elmira, Syracuse, Rome and Albany). DTI states that Elmira and Rome are not “First Order” weather stations but “have wind and surface weather data suitable for use in dispersion models”. Without any
justification, the modeling is then based on surface wind data from the airport in Rome, NY, and upper air data from the airport in Albany.

The wind roses for these airports are very different, showing predominant winds from the east/southeast at Rome and from the south at Albany. The Albany wind rose reveals the importance of the Hudson River Valley in channeling winds and the Rome wind rose presumably show the effects of local topography on wind directions at that location. By contrast, residents at Brookman Corners experience winds predominantly from the west. Furthermore, Rome, NY, is 40 miles from Brookman Corners, outside of both the Otsego Valley and even the greater Mohawk Valley. This is much too far away to be described as “representative”, especially considering the complex terrain surrounding the Brookman Corners site.

The reality is that for the Brookman Corners location, none of these sets of meteorological data are “representative” for the purposes of identifying suitable meteorological data to model air quality in the area.

For cases when no representative meteorological data is available, facilities seeking permits have an alternative approach, which is to use the screening model for AERMOD, namely AERSCREEN, to demonstrate compliance with ambient air standards. Screening models use pre-established sets of combinations of wind speeds and dispersion rates and other configuration assumptions which are designed to overestimate maximum ambient air concentrations. This would be more conservative than DTI’s use of questionable and non-representative meteorological data.

4. Failure to Map Pollutant Isopleths.

Modeling reports usually display their results on base maps that show isopleths of pollutant concentrations as a function of distance from the source area. This ought to be generally required for any permit application since it is important information for agency review and the most effective way for members of the public to see how pollution could affect their local neighborhoods. DTI’s failure to display these concentration isopleths is troubling. In light of the concerns with this proposed project, FERC and NYSDEC should specifically request this information for the Brookman Corners site.
CONCLUSIONS AND RECOMMENDATIONS

The valley location of the proposed DTI compressor station expansion is problematic with respect to expected ambient air concentrations. The use of the Rome airport surface data is not defensible on the basis of being representative of meteorological conditions at the site. The modeling performed with the AERMOD model using the applicant’s choice of meteorological data from Rome, NY, is inadequate to clearly demonstrate compliance with the NAAQS for NO₂, for PM₂.⁵ and HAPs regulations for formaldehyde.

To address the lack of representative meteorological data, the applicant should set up a meteorological tower with a minimum height of 10 meters at the site that will measure wind speeds and directions, vertical temperature gradients and surface heat flux. Regulatory agencies generally require that such site specific measurements run for a minimum of one year. This data could then be used with the AERMOD model for predicting ambient air impacts. Alternatively, the applicant could use AERSCREEN to calculate ambient air impacts and scale back emission limits as necessary to comply with the standards accordingly. To address the lack of confidence in the calculations, the applicant should monitor NO₂, particulate matter, and formaldehyde at the eastern end of the site’s property line. Isopleth maps should be produced to document modeling results of pollutant concentrations as a function of distance from the site.

In my professional opinion, confidence in the permit conditions and emission limitations of the permit would increase if DTI were to adopt suggestions by Otsego 2000 or make other improvements to reduce emissions from the proposed compressor station project at Brookman Corners.

Dated: May 31, 2015

Bruce A. Egan, Sc.D, CCM
OUR VALLEY

The Otsquago valley is complex terrain and the site of the Dominion Transmission Inc. (DTI) stacks will be situated firmly in the valley with the top of the stacks below the valley rim on 4 sides (north, west, south, east-south east) with the stream valley running due east, down the prevailing wind. A hill (Lighthall Road) is situated directly upwind of the facility and the possibility of terrain downwash could only be ruled out by expert analysis.

Stream valleys cause a process called inversion where, at dusk, the cooler air “stabilizes” and flows into the valley and settles. This is more pronounced in valleys that run downwind and away from the setting sun (east). The Otsquago valley does both and creates stability (inversion) on ALL calm nights from dusk until after sunrise the next day. This is the rule and is only interrupted by meteorological fronts. It is more pronounced on long, clear, cool nights.

The valley is disposed, just beyond the emission source location, to run slightly south of east, intersecting the prevailing wind (coming directly from the source) at a very slight angle and “capturing” that flow of air.

A tributary (the Otstungo) joins the Otsquago 2 miles downwind of the source creating a V-shaped funnel which aids the airflow “capture”. Thereafter, the airflow is directed to the village.

DISPERSION

Ideally the harmful components of emissions should disperse as quickly and completely as possible to create a low (hopefully sub-threshold) exposure to many as opposed to a high and toxic exposure for a few.

Dispersion modeling is highly complex and imperfect. It only works well in ideal, flat terrain under consistent conditions. Complex terrain requires on-site measurements, complex computer modeling and empirical (air sampling) cross-referencing.

The most critical factor for proper dispersion is effective stack height. The stacks on site are very short (12 – 15 M), however, effective stack height is dependent on emitting a very hot gas at velocity so that the plume rises very high and mixes in the higher levels of the atmosphere. The effective stack heights under operating conditions can be easily calculated. It is highly dependent on wind speed. Higher wind speeds cause the plume to bend down proportionally but higher wind speeds also dilute the emissions more readily.

DTI has based its emissions environmental impact on Aermod dispersion modeling using data from surface wind patterns 40 miles to the west in Rome,
NY. The wind rose used is anomalous and to any resident of our valley would be seen clearly to not represent the surface winds of the valley. They used upper air data from 50 miles east in Albany.

No wind studies were done near the site.

What terrain data was entered is not specifically mentioned.

The results were added to background data from the “closest locations”...Amherst, Loudonville, Rochester, Utica to show that projected totals would be below NAAQS standards. No air quality measurements were made in the valley or the village of Fort Plain.

Local factors potentially affecting the readings of certain components used as background data were not revealed.

The 3 compressor units added are expected to include 2 reciprocating compressors. For these caterpillar reciprocating compressors, running at the proposed 50% capacity, the effective stack height is 86 M (282 ft) in a light wind of 3 MPH. This is under best-case scenario of NO STABILITY (inversion) and NO TERRAIN DOWNWASH both of which will lower the plume height. Even under these ideal conditions, the plume only rises to the level of the upwind rim of the valley and may not escape the influence of low level inversion.

Since the advantage of the reciprocating compressors is that they allow for fine adjustment in pressure, it is quite possible that they will be run at a wide range of stack velocities and effective stack heights. In practice, there is no reason to believe there will be safe monitoring of the effective stack heights with the ad-lib range of throttle adjustments and these heights appear to be a concern even under proposed operating conditions.

**EMISSION COMPONENTS**

Every molecular component of the emissions except water vapor (and traces of methane and CO) has a higher molar mass than air. Therefore, it is first critical to show that, given the position of the source, the emissions do not interact with the air and terrain in such a way that components cool and take on the flow characteristics of a vapor. This should be impossible but must be ruled out using a model of the station running at the full range of capacities as reflected in actual use. Steam (vapor) has been witnessed in cold weather to be settling densely on the ground around the facility. This behavior is not acknowledged or expected to be occurring with the existing turbine compressor.
Even according to published, proposed behavior, with the effective stack height this low and under ideal circumstances, the plume will diffuse in a manner that will impact the village as it is directly downwind. The degree to which the village will be impacted has not been studied. Of great concern is the degree to which the most toxic molecular components of the emissions (VOC’s, NOx) and the inversion/sunlight ozone generation process could impact the village.

Another concerning human health worry is the deposition rates of heavy, non-molecular components (PM2.5, PM10). PM2.5 (both 24 hour and annual) were the closest to the NAAQS cut-off of the seven NAAQS monitored pollutants - even with DTI’s irrelevant background site selection. This component is also one of the most significant and growing health concerns.

Deposition velocity is a non-linear function of particle size, however, generally, the smallest particles that are affected by gravity and barely deposit from the plume, settle the slowest, are carried the furthest, are the most influenced by inversion currents AND are the most biologically concerning. These are the particles that deposit in the lungs (cancer, asthma), and those that actually are small enough to cross the alveoli into the blood (heart disease, autism). An unfortunate problem for the village that is in no way addressed by DTI is that for the effective stack height noted for the reciprocating compressors, the most concerning PM2.5 component which settles at an accepted 1 cm/sec will maximally deposit over the village. The estimate is 13.1 tons/yr.

The impact of the facility is estimated at 10.8 ug/cubic meter for PM 2.5/24hr and is highly suspect due to the anomalous off site wind data and unclear terrain data used to acquire it.

The background level of 21.0 ug/cubic meter was taken from Utica (30 miles west). The applicability of this background is highly concerning due to the proximity of the village of Fort Plain to the NYS Thruway, which is a very significant source of particulate pollution. Utica data could be a gross background underestimate.

DTI calculates that it will add over ½ again as much particulate matter to the background for a total of 31.8 ug/cubic meter which is very close to the NAAQS cut-off and is certainly inaccurate and perhaps dangerously so.

A similar calculation is made for the PM2.5 annual: 2.4 (facility) + 7.7 (Utica background) = 10.1 (total) . NAAQS=12.

Marcellus shale gas contains atypically high levels of radon which decays to Po-210 and Pb-210 with a ½ life of 3.8 days. These radioisotopes adhere to the pipeline walls and particulates. The dangers of radioactive polonium in
general (and certainly from mass discharges of particulates from this new gas) are unclear simply because they have not been studied. Polonium has a $\frac{1}{2}$ life of 138 days and is one of the most significant causes of human cancer. Pb-210 decays to Po-210 with a $\frac{1}{2}$ life of 22 years. Steady state principles therefore dictate that, at a steady deposition rate, radioactivity levels will increase for the next 88 years until they reach steady state. This will be invisible except that clear signs of elevated environmental radioactive polonium and lead would be elevated levels of lung cancer in non-smokers, bone cancers and childhood leukemia. Since the alpha radiation associated with Marcellus gas is difficult to study, it has not been done and there are no plans to do so. This could be one of those problems, like acid rain in years past, that are not assessed but irreversible and obvious in retrospect. This is a further important reason to properly study, monitor and minimize the particulate deposition before subjecting the population and environment to avoidable levels.

We now see why the inversion characteristics of the valley, the intercepting angle of its disposition and dispersion/deposition is a great concern to the residents of our valley.

We believe that for a source that will be conveniently just below the major pollutant threshold located in such concerning terrain, it is necessary to do further study for public safety reasons.

What has been done to date tells us nothing about how this specific area will be affected by this project. In fairness, DTI is not required to do so unless the community has enough concern to insist on this. DTI is quick to point out that the federally-mandated Prevention of Significant Deterioration (PSD) and Best Available Control Technology (BACT) does not apply to this project as they have slipped it just under the 100,000 ton total pollutant cut-off.

Certainly it is not the intent of the public or good government to play a silly numbers game in such an important and concerning location and thereby subject its population to such uncalculated risk, especially in that clearer truths (however inconvenient) are knowable and alternative, cleaner options currently exist.

A lot of our future may depend on how safe this situation can be made from here forward and we cannot come back and start over.
**Compressor Station Hazards**

The possibilities for health, safety or environmental harm resulting from natural gas compressor stations are many and serious. Some of these include explosions and fires, leaks and spills, fugitive emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx), as well as other potential exposure threats. While all of these types of hazards have been well documented nationwide the most prevalent, by far, is the intentional or accidental release of VOCs and NOx, but all possible threats need to be considered when allowing compressor stations to operate, especially when in close proximity to homes, places of employment or playgrounds, as well as environmentally sensitive locales such as near water resources or agricultural production areas.
Quick search key phrases for references used:

1) inversion – “Utah state university unit 7, atmospheric stability and instability”

2) dispersion – “10.3. Gaussian dispersion models”

3) effective stack height – “6.1.4 plume rise formulas, lakes environmental”

4) vapor density – “The engineering toolbox, molecular weight – gases and vapors”

5) ground level ozone – “NAAQS ozone”

6) particle deposition – “LTADS Final Report, 4. Dry atmospheric deposition”

7) particulates and health – “Health effects of particulate matter(Eng) – WHO”

8) autism – “ehp.niehs.nih.gov/1408133”

9) radon/polonium – “ehp.niehs.nih.gov/1104607”

10) Iroquois pipeline crimes – “Top 100 corporate criminals of the 1990s 25) Iroquois” and “Iroquois pipeline Exxon Valdez”

11) Blenheim explosion – “explosion in rural hamlet raises troubling questions”

12) compressor station hazards – “Fracdallas.org compressor stations and complexes”
September 12, 2016

Philip Scalia
21 Prospect Street
Fort Plain, New York 13339

Christopher M. Hogan
NYS DEC - Division of Environmental Permits
625 Broadway, 4th Floor
Albany, New York 12233-1750

RE: Dominion New Market Project
Application ID: 4-2730-00038/00001 - Brookman Corners Compressor Station

Dear Mr. Hogan:

I provide the following comments in regard to the Air State Facility permit sought by Dominion Transmission Inc. to significantly expand the size of its compressor station at Brookman Corners in the Town of Minden, New York. In its application, Dominion used surface air data from Rome, New York to characterize conditions at the compressor station site in Brookman Corners. I maintain that this is inappropriate and submit the following as evidence.

In the “Order Issuing Certificate” for the New Market Project (Docket No. CP14-497-000), FERC states that “each weather station is in the same climatological region as the corresponding compressor station.... NYSDEC considers these data to be representative of the wind speed conditions at the project compressor stations.” (paragraph 102).

This claim runs counter to direct observations made in the course of my profession as a photographer for nearly four decades. I have spent many mornings in the towns of Minden, Canajoharie, Palatine Bridge, Glen and Root, waiting for the fog to burn off. Could the conditions in my little nook of the Mohawk Valley be different than those at Griffiss International Airport in Rome?

In order to answer this question, I conducted the following experiment on September 7, 2016. In this, I was helped by Palatine native and Canajoharie resident, MaryAnn Nellis.

SYNOPSIS:
A simultaneous photographic survey of atmospheric conditions is conducted at Griffiss International Airport (site of the Rome meteorological station) and in the Otsquago/Mohawk Valleys. I photographed at Griffis and Rome, while MaryAnn Nellis photographed in the Otsquago and Mohawk Valleys. I was also able to gather information from an eyewitness at the airport.

LINK TO ALL PHOTOGRAPHS:
https://goo.gl/photos/A8iGwPbAgQXfGGRRA
THE EXPERIMENT:

There was no fog in Fort Plain when I left my house at 6:15 a.m. It was on the way to becoming a hot humid day, typical for the hot summer of 2016. I observed fog in the Mohawk to my right and Otsquago Valley to my left as I drove west on 5S, then a heavy plume hanging over the city of Little Falls where I entered I-90. From there to Rome I did not observe fog. Arriving at Griffiss Airport at 7:20 a.m., there was no fog to be seen. At 7:31 a.m. I saw a man working on the engine of an airplane. I asked him if it had been foggy that morning. He said no and that if there is a fog, it is always gone by 8 a.m. The photographs show that there was no fog at the airport from 7:20 am through 7:45 a.m., nor in Rome, through 9:46 a.m.

Simultaneously, from 7 a.m. to 9:15 a.m. MaryAnn Nellis drove around the towns of Minden, Canajoharie and Palatine, taking photographs with her cell phone. She observed and recorded fog first rolling into the Otsquago Valley, and then settling down into the Mohawk Valley. The fog persisted past 9 a.m. MaryAnn observed and recorded the first fog gathering around the compressor station at 7:11 a.m. Then she filmed Fordsbush Rd where she encountered heavier fog, closing in homes and an Amish School. Where Fordsbush Rd ends at State route 5S (4 mi from station), she could see heavy fog settling into the Mohawk Valley, and a thick rope of fog lining the Otsquago Valley. She continued on to Fort Plain which sits at the junction of the Mohawk River and Otsquago Creek. By this time (8:30 a.m.) the village was covered in fog. She documented heavy fog enveloping both schools in the village of Fort Plain. She drove through Fort Plain, crossed the river to Nelliston, then viewed the Mohawk River from Dygert Rd, town of Palatine. Lastly, she recorded heavy fog nestled over Mohawk River at 9:06 a.m., as seen from the town of Canajoharie.

GEOLOGICAL EVIDENCE AND CONCLUSIONS:

The Sept. 7 experiment confirms our direct observation that Mohawk Valley has a greater propensity for fog than Rome. The results are not surprising to us, as we experience fog lasting into late mornings, more often than not. People who grew up here tell stories about riding on the school bus many mornings through dense fog.

This is consistent with the geological evidence. The ten-mile section of the Mohawk River from Little Falls to Randall is the steepest part of the gorge. At the east end of the gorge in Randall, “The Noses” (“Little Nose” to the south and “Big Nose” to the north) act as a natural barrier, creating a bottleneck, so that fog remains in the gorge. This is practically a daily occurrence in the valley.

A newspaper clipping saved by the Little Falls Historical Society reports: “Geologists now tell us that before the last great ice age there was a topographical barrier – a ridge of solid rock wall over 300 feet high that extended about a mile and a half in length exactly where the city of Little Falls is located today. This barrier held back glacial meltdowns that resulted in huge ancient lakes that slowly eroded the top of the rock barrier at Little Falls. During the retreat of the last ice age about 10,000 years ago, the ancient lakes – Erie and Iroquois – blocked by the ice sheet in the north, sent their waters to the east towards the barrier at Little Falls. The result is described in Herkimer County at 200: ‘The enormous volume of water finally broke down the pre-Cambrian divide at Little Falls, and a mighty
river was born: the Iro-Mohawk. It swept over the divide in a waterfall greater than Niagara. The Iro-Mohawk was many times the size of the present river as can be seen when one compares the width of the Mohawk to that of its valley. “(Richard Buckley, *The Unique Little Falls Gorge*)

When the river broke through the gorge at Little Falls, it created the so-called “Disneyland of Potholes” on Moss Island, and required the highest canal lock in the world when the Erie Canal was built in 1825.

FERC’s claim that the Rome, NY is in the same “climatological region” as Brookman Corners is incorrect. Rome is not in the Mohawk Valley, which geologically begins east of Oriskany. Rather it is a “lake plain developed during the late stages of Wisconsin glaciation, when glacial Lake Iroquois extended a long arm eastward to drain into what was then the head of the Mohawk Valley at Little Falls.” (Bradford B. Van Diver, *Roadside Geology of New York*, p. 181)

“The Noses” are 560 feet sheer on the north side and 400 feet on the south side, a half mile away. At Little Falls, the rock climbs 700 feet on the north and 520 feet on the south side. These two gorges act like the two ends of a hammock, with fog suspended in between them, almost every day. This is why our local fog doesn’t burn off at 7 or 8 a.m., like it does in Rome and other places that sit on plains and plateaus. Plus, along with morning fog, there is a greater tendency for different kinds of weather to settle in, at other times of day. Fog is not uncommon in winter, making for treacherous driving. Fog often accompanies rain in our region as well.

In addition, being in the snow belt, Rome receives 107 inches of average annual snow accumulation. Minden on the other hand, is not considered to be in the snow belt. It receives less than half that much snow – 52 inches per year on average. Clearly these two places are not part of the same “climatological region.”

These geological features and meteorological conditions demonstrate that the Brookman Corners compressor station in Minden was poorly cited, and that expanding the facility to increase the level of emissions it will produce, particularly pollutants that are dangerous to human health, is ill-advised.

The photographs are empirical evidence. The Otsquago Creek’s location, in the steepest part of the Mohawk Valley, makes it highly prone to fog. At the east end of the gorge, “The Noses” impede the outflow of air, blocking the clearing effect of prevailing westerlies. There is no better indicator of air currents than the movement of fog. These topographical conditions simply do not exist in or around Rome, New York. The surface air data from Griffiss Airport is not applicable to Brookman Corners.

Thank you for the opportunity to present these findings.

Sincerely,
Philip Scalia
Photographer
Fort Plain, New York
THE PHOTOGRAPHS:
(Please note: All photographs in this document copyright 2016 by Philip Scalia or MaryAnn Nellis, all rights reserved.)

EXPERIMENT OF SEPT. 7, 2016 — SCALIA RESULTS —

Griffiss Airport 7:24 am (picture taken through fence, slightly visible in the foreground)

Griffiss Airport Runway 7:45 am.
A bright, sunny day in Rome, NY  8:03 am.

A bright, sunny day in Rome, NY  9:46 am.
EXPERIMENT OF SEPT. 7, 2016: NELLIS RESULTS –

Fog gathering around gas piping, Brookman Corners, Minden 7:11 am

Fordsbush Rd., Minden 7:35 am.
Fordsbush Rd, looking towards Mohawk River, 7:40 am.

Fordsbush Rd. 7:40 am.
Fordsbush Rd., 7:46 am.

Amish School, Fordsbush Rd.  7:49 am.
Amish School, Fordsbush Rd., 7:50 am.

Heavy fog settled on Otsquago Valley, from 5S, Minden 7:59 am.
5S (Canal Street), Fort Plain  8:15 am.
Harry Hoag Elementary School, Fort Plain 8:19 am.

Harry Hoag Elementary School, Fort Plain 8:22 am.
Playground, Harry Hoag Elementary School, Fort Plain  8:23 am.

Fort Plain High School 8:27 am.
Canal and Main, Fort Plain  8:30 am.
Mohawk River Valley from Dygert Rd., town of Palatine.  8:42 am.

Mohawk River Valley, from Seebers La., town of Canajoharie.  9:07 am.
The geological feature known as The Noses in Randall (town of Root) act to block fog from escaping the gorge. 9/3/16 9:06 am

Fog is very common in this section of the Mohawk Valley.
Here is a view of the Noses from the same perch on 6/5/04, 5:02 a.m.
Freysbush Rd in Minden, one mile from the compressor station. Snow and fog make for dangerous driving. 1/16/15 9:24 am

Fog often accompanies rain and drizzle to the town of Minden. This is the Mohawk River from 5S, near Fordsbush Rd, less than 4 miles from Brookman Corners. 3/10/16 3:52 pm.
September 09, 2016

ABLE2, Enhancing Potential, Inc. is writing in response to a natural gas compressor facility proposed in the Town of Veteran, Chemung County, NY. Status of this project was recently brought to our attention by concerned local community members. In response to what we knew at the moment and our own concerns we attended, and spoke, at a recent public hearing on August 30th, 2016 at Corning Community College. We also submitted a brief written response to DEC just prior to that hearing.

Since that hearing, and as a result of both information shared at the hearing and online project information, we have decided to provide additional written concern over the proposed project.

ABLE2, Enhancing Potential, Inc. is a not-for-profit provider of services to those in the local community. Our Mission is to “mission is to enhance the quality of life of those we serve”.

Our Core Values are:

Able2 believes that persons with disabilities are powerful contributors to community, and that all true support is rooted in person-centered practice. We believe the power of potential is realized through partnerships between those we serve, those we employ and the community in which we reside. We believe such partnerships should be formed with a commitment to ethical, responsive, and high-quality supports for individuals with disabilities.

In 1949 we established ourselves in our community to provide such services and take seriously our role to not only provide services but to advocate for those with limited voices. We value not only the quality of life of those we support but value the neighborhoods and environments in which we live, work, and play. We always try to take time to dialogue, advocate, and work together with the community. In the case of this proposed project, such communication was not sought by Dominion and we are now reacting to the current course of direction by Dominion and FERC, without adequate representation from DEC.

We are greatly concerned over the limited, or lack, of community notification provided by Dominion, DEC, or the local authorities. While Dominion filed an application for the project in June 2, 104 and such filing was recorded in the Federal Register on June 17, 2014 we received no formal notification of the project. It was noted in the FERC Order of April 2016 that notices were mailed to “local officials, the library, the newspaper, and affected property owners” we did not receive any notification at any of our 4 adjacent properties nor at our Administrative Offices. As Owner and operator of a residential facility just to the immediate West we were left uninformed of the proposed project.
We are also concerned that it appears that up until September 20, 2016 no local meetings were hosted by Dominion, DEC, or others. We found that there were 2 Scoping Meetings held in 204 but one was in Morrisville, NY and the other in Georgetown, NY. Our opportunity to speak, and become involved, was on August 30, 2016, just days after finding out about the project.

Outside of the lack of effective notification we are also concerned that seemingly incomplete, filtered, or even withheld information was used to when Dominion constructed various “Resource Reports” in June 2014.” We note the number of existing homes greatly exceeds the number considered by Dominion. In addition, during the hearings, speakers noted discrepancies in the number of actual homes versus the number of noted homes. The reports did not seem to acknowledge the nearby existence of a local elementary school to the Southwest. Various business to the Southwest, including our own, and even several group homes operated by private providers under the auspices of NYS OPWDD and NYS DOH. Other speakers at the August 30 hearing noted the existence of health care providers, retirement communities, large residential developments, and community parks to the West and the Southwest. Substantial local bodies of water while within 1 mile of the project, a re seemingly not mentioned in Dominion’s “Resource Reports”.

Our closest facility, a residential home, is 0.8 miles due West of the facility. This facility is a 5-bedroom group home for non-ambulatory persons with developmental disabilities. This site is considered home for these occupants and the site was selected with the goal of providing outdoor space such as gardening, meditation gardens, and walking trails. All occupants have varying degrees of developmental disabilities in conjunction with other physical and health limitations. They are all wheelchair bound and require round the clock assistance and care. They enjoy their time on the deck, in the yard, or near the gardens. We are concerned that they will no longer thrive due to the new noises, affected air quality, and their simple lack of ability to enjoy the outdoor spaces they chose to have. As an Agency that is focused on quality of life we have great concerns over these adverse impacts.

We are concerned about the frequency noise due to blow-offs. While some speakers likened the prolonged noise to the equivalent sounds of jet engines we are concerned that a) occupants of this home will not receive prior notification, b) the sound will be overwhelming to those with already compromised senses, and C) of any long-term effects will be seen. We can already assume it will interrupt the quiet days they chose, will impact native wildlife, and simply create an environment contrary to their desires and choices.

We are concerned about the ambient noise from the plant, described by one speaker as several diesel engines running continuously. If that is the case, how loud will it be? Will it go on 24/7? Will the plant be screened to block the transmission of the noise? That type of noise does not exist at the moment and we did not choose to have that noise present. Again, changes are being required without our initial involvement or notification.

In the hearing we were intrigued to hear the many speakers; some scientists, some researchers, some residents in other communities, all of which note the resulting likely change in air quality. Many speakers spoke to the likelihood of methane gases, formaldehydes, headaches, nose bleeds, affected mucous membranes, compromised immune systems, and even triggers for asthma. It is unclear to use how the sustained exposure to even limited concentrations will impact persons. We do not see any information that regular testing of concentrations will be done within the community. Our residents chose their home without fear or concern for these issues. If the project is approved as it stands it seems that they will now be involuntarily subjected to these risks.
We are also concerned that no baseline health studies has been performed or even planned for our community. We deem it a necessary step if allowing DEC, and medical providers, to monitor and predict changes to the residents of this community if the project moves forward. Many of our residents already have health issues and vulnerability to even the slightest changes to their air quality where they chose to live. The unknown risks seem unacceptable to us at this time.

We also operate 3 other facilities within a 2-mile radius of the proposed compressor project. One is 3 bedroom group home within 1.5 miles to the Northwest, a second is a 5 bedroom group home 1.8 miles to the Southwest of the proposed project, and the third is a combination 22 bed residential facility and business occupancy 2 miles to the Southwest. Simple adjacency issues raise concern in the event of a catastrophic emergency at the compressor station or the long-term effects on the air quality. We find it concerning that our facilities were not even mentioned as possible concerns in the 2014 “resource Reports”, even though 3 of the 4 existed at the time.

In the case of any of our 4 adjacent facilities we are always concerned about expedited and effective notification and evacuation in any emergency. We will likely need to provide additional training and controls in place to anticipate any possible compressor station emergency. As we plan for all contingencies we have seen no data or information provided by Dominion of how they will notify us, how quickly they will do it, and any associated risks with plant failures, explosions, leaks, emission control failures, etc. We ask DEC to force consideration of those contingencies and require Dominion, and it’s operators, to involve the community in those contingencies.

We are also concerned about the long-term health effects on the 38 residential occupants and the 131 staff working in those locations. Our efforts will continue to focus on quality of life through effective supports. We work actively with NYS OPWDD, NYS DOH, and NYS OFPC to ensure we provide safe, effective, and valued services. We are concerned that our occupants and staff are now forced with assuming new risks while performing their day-to-day roles. From the information provided at the public hearing it seemed plausible that studies, data, and summaries all seem to point to the likelihood or long-term health issues.

We would expect, and call for DEC to consider their responsibility to the local communities and the environment and perform all necessary and available application processes for due diligence. We ask that you not approve the project in its current state and that you use your authority and obligations to ensure that all possible risks have been weighed, that all associated risks are mitigated, and that any forward progress of the project ensue that the community is considered, involved, and safe.

Sincerely,

Mark Peters
Executive Director

Adam Hungerford
Director of Environmental and Fleet Services
There are important reasons why gas turbine operators around the world have selected Solar® gas turbines with dry low emissions (DLE), pollution-prevention SoLoNOx™ combustion systems to meet local exhaust emission regulations:

- **Unrivaled Experience**: More than 35 million operating hours on SoLoNOx combustion systems.

- **Fuel Options**: Natural gas, dual fuel (natural gas/distillate) and associated gas systems available.

- **Low Emissions Guarantees**: Gas turbines with SoLoNOx technology are designed to meet virtually all exhaust emission regulations throughout the world during steady-state operation at 50-100% engine load at all ambient temperatures above -20°C (0°F).

- **Cost Effectiveness**: Gas turbines with SoLoNOx do not require water or steam injection.

- **High Performance**: Turbine engines with SoLoNOx provide the same power and heat rate with the same reliability and availability as Solar’s equivalent models with conventional combustors.

- **Global Support**: Solar’s global Customer Services organization has trained, experienced personnel available around the clock at 39 strategic locations to quickly respond to customer needs for field service, overhauls, retrofits and upgrades, service parts, and many other support services.

Solar Turbines has been a leader in pollution-prevention technology, introducing SoLoNOx in 1992 as a customer option for natural gas fueled gas turbines rated at outputs of 3.5-MW and above, including the **Centaur**, **Taurus**, **Mars** and **Titan** gas turbine families. Since its introduction, SoLoNOx technology has saved an estimated 1.2 million tonnes of NOx emissions.

SoLoNOx utilizes lean-premixed combustion technology to ensure an extremely uniform air/fuel mixture and stringently control the combustion process to prevent undesirable emissions from forming. That’s why we refer to gas turbines with SoLoNOx as pollution-prevention engines.

Of course, Solar Turbines continues to work to meet tougher emission standards in the future. That’s just another reason why more customers prefer and select Solar gas turbines over any other industrial turbomachinery. Solar’s customers can count on our continuous product technology development and improvement programs to bring them advancements like SoLoNOx to meet their requirements.

**For More Information:**
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Vent Capture Solutions for the Oil and Gas Industry

Methane, VOC and BTEX Destruction
“Creating Green Solutions that Provide Environmental and Economic Value to the Oil and Gas Industry”
Vent Capture Solutions for the Oil and Gas Industry

**CHALLENGE**

Vented hydrocarbons are a major source of carbon and toxic gas emissions. Governments are responding with more stringent legislation. Small to medium sized emissions are difficult to deal with in a cost effective manner.

**SOLUTION**

Various technologies are available to mitigate vented gas emissions. Some of these offer simultaneous reduction in vented emissions and carbon.

**VALUE**

Benefits of eliminating vented gas emissions:
- Regulatory compliance
- Improved site odor
- Public relations
- Health benefits
- Carbon offsets
- Improved efficiency
- Improved reliability
- Increased profits
What are the sources?

- Instrument gas vents
- Petroleum liquid storage tanks
- Compressor Packing vents
- Dehydrators
- Pneumatic pumps

Challenge: these sources can be highly variable, low pressure, carry entrained liquids or a combination of all of these.
Components of Interest

Methane
- Significant Greenhouse Gas (GHG) source \((GWP = 25 \times CO_2)\)
- Can be used as a supplementary fuel source
- Subject to existing and upcoming legislation

BTEX
- \(BTEX = \text{Benzene, Toluene, Ethyl-benzene, Xylene}\)
- Benzene is a known carcinogen
- Regulated in most jurisdictions

VOCs
- are a precursor to local ozone
  - Regulated
    - EPA NSPS subpart OOOO
    - PA Exemption 38
Concept

• A system design to capture vented hydrocarbon vapours from atmospheric vents and combust them in a natural gas engine as a supplemental fuel.¹

Applications

• Instrument and compressor rod packing vents
• Dehydrator still columns and flash tanks
• Condensate and oil storage tanks

Benefits

• Destruction of CH4, VOCs and BTEX
• Fuel savings
• Reduced GHGs
• Reduced site odour

Getting a free boost!

¹ Patented
A Patented REM Technology System

For the reduction of Vented Emissions from Reciprocating Compressor Packing Vents, Condensate Tanks and other vented sources.
Using vented natural gas as fuel!

- **What is SlipStream?**
  - A method and apparatus for utilizing vented gases as a supplementary fuel source on natural gas engines and other combustion devices such as Dehy and Tank heaters

- **Benefits:**
  - Reduced vented emissions
  - Reduced fuel costs
  - Significant GHG reductions
  - GHG credits
SlipStream® Technology

Vent Gas Sources

- Compressor packing
  - ReCip packing glands
- Liquid storage tanks
  - Oil storage
  - Condensate Tanks
  - Scrubber dump collection
  - Separator dump collection
  - Highly Variable
- Other
  - Dehydrators
  - Cactus dryers
Efficiency of Destruction

- An internal combustion engine is very efficient in combusting fuel
- VOC destruction > 99%
- For most systems the added fuel is < 10% of engine fuel
- Advanced systems take up to 50% of engine fuel
- No catalyst fouling
REM Vue® SlipStream®

SlipStream® SS3

- SlipStream solution for compressor packing vents.
- 10% of main engine fuel up to 3 kg/hr (6.6 lb/hr).
- Compatible with most OEM & 3rd Party AFR Controllers.
SlipStream® SS3 System
Packing Vent & VOC Emission Reduction Technology

From Compressor Packing Vent to Engine as Fuel Gas
Summary of Encana’s REMVue AFR and SlipStream Project

“In 2012, with funding from its Environmental Innovation Fund and Climate Change and Emissions Management (CCEMC) Corporation, Encana initiated a two-year program to install vent gas capture systems at natural gas compressors in southern Alberta. The full 52-site deployment is now 85 percent complete and all of the vent gas capture systems are expected to be operational by June 2014. Each system captures fuel gas that was vented to the atmosphere as part of normal operations and redirects it into the compressor engine’s air intake to help fuel the engine. The technology was developed by REM Technology Inc., a division of Spartan Controls, based in Calgary. By redirecting this gas to fuel the engines, Encana expects to recover approximately 175 million standard cubic feet of sales gas per year ($550k in fuel savings), reduce emissions by more than 69,000 tonnes of carbon dioxide equivalent (CO2e) annually and generate $1 Million per year in carbon offsets.” *

*From Encana’s submission to CAPP Responsible Canadian Energy (RCE) Award program
Focus on Fuel Replacement: Compressor Packing Vents

Fuel Savings at $2.50/GJ
- One engine (1000hp) uses ≈ 180kg/hr
- Typical Vented Gas Available ≈ 3 to 20kg/hr
- Fuel savings ≈ $3K to $23K/yr

GHG CO2(e) credits at $15/tonne
- Typical Methane ≈ 95%
- GHG Credits ≈ $9K to $60K/yr

600-4000 tonnes
$12K-83K per year
Recent Conoco Presentation at PTAC Conference

Waste to Wealth

Case Study – Glycol Dehy “Waste Gas” to Engine Air Intake (SlipStream)

Sean Hiebert, CET, P.Eng.
Operations Engineer – WCBU Operations Energy Efficiency
ConocoPhillips Canada
Phone: (403) 532-7518
Cell: (403) 969-8004
Email: Sean.V.Hiebert@cop.com
Opportunity...

What if you operate a facility which has BOTH TEG dehydration and a Reciprocating Engine(s)?

Why not use the dehy waste gas instead of venting/burning it?
Typical Compressor Station

A glycol dehydration unit operation is *often* adjacent to an engine-driven compressor, but *not* always!
Pilot Site - After

Dehy Waste Gas
Collected/Piped to Engine Air Intake

Dehy Waste Gas
(off condensing tank)
Success! We think...

- Staged Commissioning / Start-up Approach
  - Sept 28th, 2013 – Commissioned / Started-up the package with a REMVue® 500AS w/ SS50 Control System
  - Oct 15th, 2013 – Commissioned / Started-up the dehy waste gas SlipStream
  - Ongoing site training / monitoring
    - Detailed engine inspection to be conducted at the next scheduled service

- Currently displacing >10% of the engine’s normal FG
  - Engine currently running on ~15 kg/hr, 0.42 E3m3/d of dehy waste gas
  - ~2675 tonnes CO2e/yr GHG reduction
- >98% Dehy BTEX destruction in the adjacent internal combustion engine
  - Improved emission plume dispersion (engine exhaust stack vs. conventional)
- Site odor has significantly improved
- Worker BTEX exposure has been significantly reduced
- Operations has stated that the engine is starting / running great
  - Appears to be another viable dehy waste gas handling option...
  - Stay tooned!
Glycol Dehydrator BTEX Emissions

CHALLENGE

WELL

DEHYDRATOR

SALES

Wet Gas (Gas + H₂O)

H₂O Vapour + BTEX

Still Vent

Re-Boiler

Glycol Recycle

Glycol

Contactor

Dry Gas

Wet Gas + Glycol
SOLUTION

- Fuel Gas
- Liquids Knockout
- High Pressure Burner
- Low Pressure Burner
- Aux Burner
- BTEX
- Exhaust Stack
- Still Vent
- Glycol Re-boiler
SlipStream® GTS-DeHy
SlipStream® GTS Vapor Combustor

The GTS is an enclosed Combustion System that is used as an Emission Control Device for Storage Vessels to meet Federal and State Compliance Regulations
SlipStream® GTS Technology

• No pressurization or recompression required

• Vent gases pass through a certified valve train (meets NFPA 8502 & CSA B149.3) which turns the burner on to combust the vent gas when vent pressure is detected
  – Main burner used for normal GPU operation as well as Vapor destruction
  – Vented gas are burned in the Main or Aux Burner via special low pressure orifice nozzle
  – Minimal increase in vent system pressure (between 3-4 oz)

• High VOC, BTEX and Methane destruction factor
  – The Air Fuel Ratio of each burner is adjusted to ensure maximum destruction for both the Main fuel and Vented Gases.
  – > 99% Destruction Efficiency
BGR-18 LP Combustor Description

- Meets the requirements of EPA NSPS 40 CFR 60 Subpart 0000, AER D 60 and Saskatchewan S 20 regulations
- Easily handles intermittent flows
- Produces no visible flame
- Air in-take flame arrestors available to allow for reduced spacing on tear dropped locations
- Low skin and tip temperature
- Flow Rate: up to 15,000 scf/d or 424 m3/d (up to 1200 BTU gas)
- 18” x 13’ free standing
- 99.99% total hydrocarbon destruction as low as 1.5 oz or 0.09 psi
- Can operate with or without pilot gas
- CSA approved, B 149.3 compliant, ACL 3200 ignition control system complete with:
  - Solar operation 12/24 volt dc
  - Remote start/stop
  - Auto re-light
  - Temperature sensing and monitoring
  - Modbus communication built in
  - Data logging
MEMO

From: Keith Schue, Technical Adviser for Otsego 2000 and Mohawk Valley Keeper

Date: February 2, 2016  (revised 9-11-16 to update link for EPA Natural Gas Star website)

RE: Vapor Recovery for Reciprocating Compressor Engines at Brookman Corners Compressor Station

This memo summarizes information about the REM-Tech Slipstream system for vapor recovery and its potential applicability to the Brookman Corners compressor station, provided to me by Mr. Cam Dowler of Spartan Controls. REM-Tech, Inc. is a division of Spartan Controls.

Revised NSPS 0000 Regulations Support Use of Rem-Tech Slipstream

In December 2014, the U.S. Environmental Protection Agency revised its NSPS 0000 regulations to allow the use of Slipstream to satisfy emission reduction and maintenance requirements at compressor stations. Prior to this, the industry was required to replace the rod packing on reciprocating equipment every 26,000 hours or 36 months. Even with regular maintenance, however, venting of gas from multiple cylinders within a reciprocating engine/compressor occurs during normal operation, and the amount of that vented gas increases over time as rod packing wears out prior to replacement.

Paragraph a(3) of §60.5385 specifically provides for the collection and processing of rod packing emissions under negative pressure through a closed system, such as Slipstream. In addition to potentially reducing the amount of maintenance and replacement required, the advantage of Slipstream is that virtually all vented gas can be recovered rather than lost to the atmosphere. Slipstream routes rod packing emissions through a controlled and monitored system to the air intake of the reciprocating engine, where they are combusted as part of the fuel stream, thereby improving fuel efficiency while reducing greenhouse gas emissions. REM-Tech reports 99% destruction of volatile organic compounds (VOCs) and BTEX captured. (Cost and fuel-saving benefits of Slipstream are further discussed below.)

The fact that the U.S. EPA has certified REM-Tech’s Slipstream system for use pursuant to NSPS 0000 regulations and even modified those regulations to encourage its application should respond to any concerns regarding whether this is “proven” technology. NPS 0000 regulations apply to all aspects of natural gas production, transmission, and distribution. This includes interstate pipelines.

With respect to safety, Slipstream meets all Class 1 Division 2 Hazardous Area regulations and is equipped with a robust flow monitoring and alarm system to record and report operating conditions, fuel savings, and abnormal increases in leakage. In Canada, Slipstream has also been accepted into the country’s greenhouse gas credit program.

The NSPS 0000 regulations, including paragraph a(3) of §60.5385 providing for the use of Slipstream for compliance, can be found here: [http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=f5bf77a7af9de5a9dc66fe0023e667d&ty=HTML&h=L&mc=true&r=SECTION&n=se40.7.60_15385](http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=f5bf77a7af9de5a9dc66fe0023e667d&ty=HTML&h=L&mc=true&r=SECTION&n=se40.7.60_15385)
**Demonstrated Success of REM-Tech Slipstream**

The REM-Tech Slipstream system has been installed on more than 100 engine/compressors throughout North America, including at compressor stations that are part of midstream gathering systems and transmission pipelines.

In its January 6th letter to Otsego 2000 and Mohawk Valley Keeper (included as an attachment in the January 8th letter to the DEC), Dominion states that the only case study that it received from REM-Tech was for an application that did not involve a CAT 3608 reciprocating compressor, implying that Slipstream has not been used on a CAT 3608 before. This is incorrect. Slipstream has been used with the very same Caterpillar equipment proposed for Brookman Corners. In fact, the REM-Tech Slipstream system has been functioning since 2011 with a CAT 3608 at a compressor station in north Texas operated by Targa Resources. Targa has also installed Slipstream on five of its CAT 3606 compressor engines, which are very similar to the CAT 3608. Targa actually received an **Environmental Excellence Award** from the Gas Processors Association (GSA) for using Slipstream at these compressor station sites, as prominently featured in the following publication: (See article on page 6): [https://gpaconvention.org/assets/convention/pdf/2015/2015-GPA-Show-Daily-Monday.pdf](https://gpaconvention.org/assets/convention/pdf/2015/2015-GPA-Show-Daily-Monday.pdf)


In addition, the Slipstream system was featured at the 2012 Natural Gas Star Implementation Workshop, presented jointly by Targa Resources and REM-Tech: [https://www.epa.gov/sites/production/files/2016-04/documents/nasser.pdf](https://www.epa.gov/sites/production/files/2016-04/documents/nasser.pdf) (A copy of this presentation was previously provided by Otsego 2000 to FERC, DEC, the Town of Minden, and Montgomery County.)

Beyond this, Encana Corporation has installed Slipstream at 52 natural gas compressor stations with a grant from the Climate Change and Emissions Management Corporation (CCCEMC) of Alberta, Canada. Nearly half (25) of those are on Caterpillar engines. As a result, the company estimates that it will reduce greenhouse gas emissions by 74,000 tons per year and save $550,000 in natural gas fuel annually. [https://www.encana.com/news-stories/our-stories/innovation-closing-the-loop.html](https://www.encana.com/news-stories/our-stories/innovation-closing-the-loop.html)

Progress and success of Encana’s project is described in the second half of the following two part presentation on Slipstream: [https://www.globalmethane.org/expo-docs/canada13/og_09_malm_1.pdf](https://www.globalmethane.org/expo-docs/canada13/og_09_malm_1.pdf)

Conoco-Phillips has also had success with Slipstream as seen in the following video which describes the use of Slipstream to recover gas from a reciprocating engine and dehydrator at a boosting compressor station: [https://www.youtube.com/watch?v=asyVvy0w898](https://www.youtube.com/watch?v=asyVvy0w898)

Several of these example involve gathering or midstream applications; however the REM-Tech Slipstream system is equally applicable to transmission pipelines. Regardless of where a reciprocating engine/compressor like the CAT 3608 is used, the method by which Slipstream captures rod-packing emissions is identical, providing a beneficial function of collecting and destroying VOCs, BTEX, and methane that would otherwise enter the atmosphere.

Although not discussed here, Slipstream can also be used to capture vented gas from glycol dehydrators and heaters which contain burners. Spartan Controls can provide additional information about this upon request.
**Cost and Fuel Savings**

According to Mr. Dowler of Spartan Controls, the REM-Tech Slipstream system costs approximately $15,000, plus $10,000 for installation, for a total cost of about $25,000 per system. For best performance, he recommended installing two systems at Brookman Corners, one for each of the CAT 3608 reciprocating engines. This amounts to a total investment of only about $50,000. Even if fuel savings are ignored, implementation of Slipstream is an extremely affordable method of substantially reducing greenhouse gas emissions and VOCs, which would otherwise be vented to the atmosphere.

However, since Slipstream actually collects and burns captured hydrocarbons, it also becomes a smart economic investment. The system pays for itself, often within a few months. Following payback, savings continue year after year for as long as the system is in operation. As mentioned above, Encana Corporation estimates that Slipstream saves its company over half a million dollars in fuel annually.

REM-Tech estimates that a typical 1000 horsepower reciprocating engine equipped with Slipstream will save $4300 to $32,000 annually, depending on leakage rate and the price of gas. Based on this, a 2370 horsepower CAT 3608 recip equipped with Slipstream could save $10,000 to $76,000 annually, Furthermore, greenhouse gas emissions measured in CO2e could be reduced by thousands of tons per year. As previously discussed, Slipstream can also reduce maintenance costs.

**Installation Does Not Require Redesign**

The REM-Tech Slipstream system is an “add-on”, requiring no redesign of Dominion’s proposed project at Brookman Corners. Spartan Controls also offers a complete “turn-key” service whereby they will install and verify operation of the system. The installation is performed within a few hours, so no delay for the project would be incurred.

**Conclusion**

Dominion’s willingness to add an oxidation catalyst to the exhaust stack of the existing Taurus 60 turbine at Brookman Corners is an important improvement that will reduce total projected levels of CO, NOx, and formaldehyde. This will also somewhat reduce VOCs from the exhaust stack of that turbine. However, the overall amount of VOC reduction at the site would be relatively small (2%) due to the addition of two CAT 3608 reciprocating engine/compressors that introduce a significant new source of vented emissions. Installing Slipstream on these two recip would help address this mitigation gap. It would also reduce total greenhouse gas emissions, including vented methane.

All of the benefits discussed above (reduced VOC and greenhouse gas emissions, affordability, fuel savings, and ease of installation) clearly warrant installation of Slipstream technology at Brookman Corners. These benefits are compounded by unique conditions of the area that can cause vented emissions to linger in the Otsquago Creek valley, with greater exposure to the surrounding community, particularly children. Installing Slipstream at Brookman Corners would go a long way toward demonstrating good will, innovation, and flexibility by Dominion and easing community concerns.

Mr. Dowler of Spartan Controls has indicated that he would be happy to speak or meet with Dominion and other interested parties, including Otsego 2000 and Mohawk Valley Keeper, to answer any further questions and discuss the possibility of installing Slipstream at Brookman Corners.